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Transportation Interface; Guidance Manual

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16. Abstract (Limit: 200 words) This manual outlines the requirements applicable to generators and transporters of hazardous waste according to both the Department of Transportation (DOT) and the Environmental Protection Agency (EPA) regulations. It explains how EPA's hazardous waste regulations apply or add to DOT's Hazardous Materials Transportation Regulations (HMTR).			
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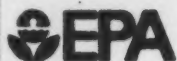
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Guidance Manual

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G U I D A N C E M A N U A L

ENVIRONMENTAL PROTECTION AGENCY -

DEPARTMENT OF TRANSPORTATION:

HAZARDOUS WASTE TRANSPORTATION INTERFACE

This guidance manual (SW-935) was prepared by
Elaine V. Schosman and Donna M. Inman for
the Office of Solid Waste and
Emergency Response

U.S. ENVIRONMENTAL PROTECTION AGENCY
1981

ii COLOR ILLUSTRATIONS REPRODUCED
IN BLACK AND WHITE

I. Introduction

The Resource Conservation and Recovery Act of 1976, directs the Administrator of the Environmental Protection Agency, under Subtitle C of the Act, to promulgate regulations ensuring the proper transportation, treatment, storage and/or disposal of all wastes defined as hazardous. Section 3003 of the Act (RCRA) requires EPA to develop standards applicable to transporters of hazardous wastes as may be necessary to protect both human health and the environment. Further, this section of the Act (RCRA) states under paragraph (b) that "in case of hazardous wastes identified or listed under this subtitle which are subject to the Hazardous Materials Transportation Act (88 Stat. 2156, 49 USC 1801 and following), the regulations promulgated by the Administrator under this section must be consistent with the requirements of the Hazardous Materials Transportation Regulations."

In order to best achieve consistency between the EPA and Department of Transportation regulations, a substantial portion of the Hazardous Waste Regulations regarding the standards applicable to transporters corresponds with the Hazardous Materials Transportation Regulations (HMTR) already promulgated by the DOT. Moreover, the DOT has amended the HMTR to incorporate most of the regulatory requirements set forth by RCRA. Thus, since both EPA and DOT regulate in-transit management of hazardous waste, it was necessary that the corresponding enforcement responsibilities of each Agency be defined. To fulfill this need, EPA and DOT jointly adopted a Memorandum of Understanding (MOU) defining to what extent each Agency is responsible for enforcement of these regulations (see Appendix V).

This Guidance Manual has been developed to explain the interface which occurs between the DOT and EPA regulations when hazardous wastes are transported. The Manual will not address those sections of the HMTR dealing with transportation by pipeline (Part 195 of HMTR) primarily because the EPA regulations under sections 265.1 and 260.10 of the Hazardous Waste Regulations do not apply to pipeline transportation; and thus, no interface occurs in this particular area. However, this manual will address the types of practical questions that continue to arise regarding the EPA and DOT requirements for hazardous wastes transportation. For instance:

- Q: What kinds of containers may be used for transporting hazardous wastes?
- Q: Will trucks hauling hazardous wastes have to be placarded on the outside to declare their wastes?
- Q: How can a DOT proper shipping name be developed for a mixture of hazardous waste?

Q: As a small quantity generator excluded under section 261.5, do wastes have to be placarded?

Q: Are hazardous waste shipments restricted from certain modes of transportation?

Q: Can all hazardous wastes be classified according to the DOT hazard class systems?

In response to these and other questions, the following manual will provide the practical guidance needed for interpreting the HMTR. The manual will discuss each of the major sections of the HMTR and explain how the Hazardous Waste Regulations apply to or add to the HMTR for the transportation of hazardous waste.

II. The Hazardous Materials Transportation Regulations, Title 49

A. General Scope and Description of the HMTR

Effective implementation of the Hazardous Waste Regulations hinges on a clear understanding of the HMTR found in Title 49. Moreover, it is essential for all persons involved with the transportation of hazardous wastes to become familiar with each Agency's role in this expansive field.

The Department of Transportation has the authority to regulate the interstate and intrastate transportation of hazardous materials under the Hazardous Materials Transportation Regulations (49 CFR 100 - 199). The regulations address all modes of transportation (air, rail, highway, waterway and pipeline). DOT has established requirements for shipping papers, proper containers, marking and labeling of containers, placarding of vehicles, and incident reporting.

According to a past interpretation by the Office of Hazardous Materials Operations, any material, including waste, which meets the DOT criteria of a hazardous material must be handled according to the appropriate requirements of the HMTR. The Office of Hazardous Materials newsletter of April/May 1977 stated, "There have been numerous inquiries to the Office of Hazardous Materials Operations regarding the applicability of the Department's Hazardous Materials Regulations to the transportation of waste materials. These regulations are structured to apply to any material that may pose undue hazard in transportation and, as such, do not differentiate between waste and other than waste materials. If, after processing, a material meets the definition of a hazardous material, then that material must be classed and shipped in accordance with the requirements prescribed for the hazard associated with the material.

The Department's Hazardous Materials Regulations apply to any material regardless of its end use and the fact that a material is considered a waste material does not relieve application of these regulations."

The DOT reconfirmed this 1977 interpretation of hazardous wastes on May 22, 1980, when it specifically included the transportation of hazardous wastes in the HMTR. In section 171.3 of the May 22 amendments, the DOT states, "No person may offer for transportation or transport a hazardous waste (as defined in section 171.8 of this subchapter) in interstate or intrastate commerce except in accordance with the requirements of the HMTR." Section 171.8 defines hazardous wastes as "any material that is subject to the hazardous waste manifest requirements of the EPA specified in 40 CFR 262 . . ." In addition, DOT has created a new ORM-E hazard class to accommodate those hazardous wastes which are regulated by EPA, but would not otherwise fall into one of the hazard classes previously developed by DOT.

In light of these new DOT amendments, and the specific requirements set forth by EPA for hazardous waste transportation, all shippers and carriers according to the DOT terminology, and generators and transporters according to the EPA terminology, are required to comply with the DOT marking, labeling, placarding, packaging and other shipping requirements when offering hazardous wastes for intrastate, interstate, and international transportation.

B. Hazardous Materials Table

Introduction

The Hazardous Materials Table (Table) found in section 172.101 of the HMTR provides the basis for understanding the Hazardous Material Transportation Regulations. The Table lists those materials and wastes designated by the DOT as hazardous for the purposes of transportation. It also identifies the proper shipping names, hazard classifications, United Nations/North American identification numbers and references the requirements for labeling, packaging and shipping procedures for the designated hazardous materials or hazardous wastes. The key feature to the Table is that it compiles the regulations into an index which shippers (generators) and carriers (transporters) can use to readily ascertain whether a specific material or waste they wish to offer or transport is hazardous, and if it is, what procedures they must follow to transport it.

The following section of this Manual will explain how the Hazardous Materials Table is used for the transportation of hazardous wastes. Although the Table principally addresses hazardous materials, it also incorporates all the wastes regulated by EPA. To use the Table specifically for hazardous wastes, it must first be remembered that DOT views hazardous wastes as a subset of hazardous materials. Thus, a hazardous waste will always be regarded by DOT as a hazardous material subject to certain additional requirements set forth by both DOT and EPA. One such requirement, for example, is the inclusion of the word "Waste" as the first word of the DOT proper shipping name of a listed hazardous material when the material is shipped as a waste. Another example includes the use of a manifest in addition to a DOT shipping paper, for the transportation of a hazardous waste. If a manifest also meets all the DOT shipping paper requirements, it may be used as a shipping paper. In considering the following discussion of the Hazardous Materials Table, remember that all of the general rules, as well as the specific requirements for shipping a hazardous material also apply to shipments of hazardous wastes.

2. How To Use The Hazardous Materials Table

The Hazardous Materials Table (HMT) found in section 172.101 of the HMTR is divided into seven (7) major columns. The columns reference certain sections of the Hazardous Materials Transportation Regulations (HMTR), as well as outline specific requirements to be followed by shippers and carriers of DOT listed hazardous materials or hazard classes.

Figure I - Representative section from The Hazardous Material Table

§ 172.101 Hazardous Materials Table

(1) +/ E/ A/ W	(2) Hazardous materials descriptions and proper shipping names	(3) Hazard class	(3A) Identification number	(4) Label(s) required (if not excepted)	(5) Packaging		(6) Maximum net quantity in one package		(7) Water shipments		
					(a) Exceptions	(b) Specific requirements	(a) Passenger carrying aircraft or railcar	(b) Cargo only aircraft	(a) Cargo vessel	(b) Passenger vessel	(c) Other requirements
	Accumulator, pressurized (<i>pneumatic or hydraulic</i>), containing nonflammable gas	Nonflammable gas	NA1956	Nonflammable gas	173.308		No limit	No limit	1,2	1,2	
	Acetal	Flammable liquid	UN1088	Flammable liquid	173.118	173.119	1 quart	10 gallons	1,3	4	
E	Acetaldehyde (<i>ethyl aldehyde</i>) (RQ-1000/434)	Flammable liquid	UN1069	Flammable liquid	None	173.119	Forbidden	10 gallons	1,3	5	
EA	Acetaldehyde ammonia (RQ-1000/434)	ORM-A	UN1841	None	173.505	173.510	No limit	No limit	1,2	1,2	
E	Acetic acid (<i>aqueous solution</i>) (RQ-1000/434)	Corrosive material	UN2790	Corrosive	173.244	173.245	1 quart	10 gallons	1,2	1,2	Stow separate from nitric acid or oxidizing materials
E	Acetic acid, glacial (RQ-1000/434)	Corrosive material	UN2789	Corrosive	173.244	173.245	1 quart	10 gallons	1,2	1,2	Stow separate from nitric acid or oxidizing materials. Segregation same as for flammable liquids
E	Acetic anhydride (RQ-1000/434)	Corrosive material	UN1715	Corrosive	173.244	173.245	1 quart	1 gallon	1,2	1,2	
	Acetone	Flammable liquid	UN1090	Flammable liquid	173.118	173.119	1 quart	10 gallons	1,3	4	
E	Acetone cyanohydrin (RQ-10/4.34)	Poison B	UN1541	Poison	None	173.346	Forbidden	55 gallons	1	5	Shade from radiant heat. Stow away from corrosive materials
	Acetone oil	Flammable liquid	UN1091	Flammable liquid	173.118	173.119	1 quart	10 gallons	1,2	1	

COLUMN (1): +/E/A/W

This column contains four (4) symbols, "+", "E", "A", "W", which correspond to the listed hazardous materials/wastes and hazard classes as appropriate. When any one of the symbols or combinations of symbols are used in this column, they should be interpreted as follows:

"+" The use of a plus (+) before any material indicates that both the listed proper shipping name and hazard class of the material cannot be changed regardless of whether the material actually meets the definition of the specified hazard class. (See Appendix II for a list of definitions of hazard classes). Any changes, including the use of an alternate shipping name or hazard class, must be authorized by the Associate Director for the Office of Hazardous Materials Regulation, Materials Transportation Bureau, Department of Transportation. (49 CFR 172.101(b))

"E" The letter E before a material identifies it as a hazardous substance. These substances are subject to the HMTR irrespective of the mode of transportation used or the hazard

class represented. When either of these two DOT proper shipping names are used - the technical, generic or chemical names of the hazardous substance must be included in the basic description on the shipping paper or manifest. In the event that a hazardous substance fails to exhibit any of the characteristics of the 15 DOT hazard classes, the substance must then be assigned the ORM-E hazard class. (49 CFR 172.101(b)) Example - Hazardous Substance, liquid or solid, n.o.s. - or Hazardous Waste, liquid or solid, n.o.s.

"A" The letter A before a material confines the HMTR to transportation solely by aircraft. In other words, the same material shipped by any other mode of transportation would not be subject to the requirements of the HMTR. However, an "A" before any material which is shipped as a hazardous waste does not exclude that material/waste from the manifesting and shipping requirements under RCRA, regardless of the mode of transportation used. (49 CFR 172.101(b)).

"W" The letter W before a material limits the HMTR to transportation solely by vessel. Once again, a "W" before any material which is shipped as a hazardous waste does not exclude the material/waste from the manifesting and shipping requirements under RCRA, regardless of the mode of transportation used. (49 CFR 172.101(b))

COLUMN (2): Hazardous Materials Descriptions and Proper Shipping Names

This column lists the proper shipping names of materials designated by DOT as hazardous. Proper shipping names are limited to those shown in Roman type (not italics). However, italicized words may be used in addition to a proper shipping name. When selecting a proper shipping name to describe a particular material, the name on the Table which most accurately identifies the material must be used. In the event that the correct technical name of a material is neither listed nor entirely accurate, selection must then be made from the general descriptions or n.o.s. (Not Otherwise Specified) entries corresponding to the specific hazard class of the material being shipped. These descriptions or n.o.s. entries are listed in alphabetical order throughout the Table. For example, an alcohol must be shipped as an "Alcohol n.o.s." rather than a "Flammable liquid n.o.s." unless the technical name of that particular alcohol compound is listed (methyl alcohol). Also, some mixtures may be more aptly described by their applied uses, such as "Compound, cleaning liquid" or "Compound, rust removing," rather than "Corrosive liquid n.o.s." Section 172.101 (1 - 13) lists certain other modifications to the DOT proper shipping name that can be made as well.

These modifications include:

- (1) If the technical name of a hazardous material which is shipped as a hazardous waste is listed in this column, the proper shipping description must then include the word "Waste" before the name of the material, i.e., "Waste acetone" (49 CFR 172.101(c))
- (2) A mixture or solution of a listed hazardous material and nonhazardous material may be described using the proper shipping name of the listed hazardous material, if (1) the mixture or solution is not specifically listed elsewhere in the Table; (2) the hazard class of the mixture or solution is the same as that of the hazardous material; and (3) the qualifying word "mixture" or "solution", as appropriate, is added as part of the proper shipping name. For instance, a solution of acetone, mineral oil and water, meeting the definition of a flammable liquid, may be described as "Acetone solution" (49 CFR 172.101(c)).
- (3) If the proper shipping name for a mixture or solution that is a hazardous substance does not include the name of the hazardous substance or substances, each hazardous substance found in the mixture or solution must be identified in association with the basic des-

cription.. For example, the listed solution "arsenic acid solution" containing the hazardous substance arsenic chloride liquid must be described as "Arsenic acid solution (arsenic chloride liquid)". This modification is particularly important to remember when shipping hazardous substances which also qualify as hazardous wastes. (49 CFR 172.101(c))

- (4) Except for those proper shipping names preceded by a "+" in column 1, any material which meets the definition of a hazard class other than the one specified with its proper shipping name must be described by the shipping name that appropriately corresponds with its actual hazard class. For example, if a compound is listed and identified as "Beryllium compound n.o.s., Poison B," but actually displays the characteristics of an oxidizer, it must be described as "Oxidizer, n.o.s." or "Oxidizing material, n.o.s." (49 CFR 172.101(c)).
- (5) If a hazardous material or waste will be classed under an n.o.s. name because it is a mixture or solution of one or more hazard classes, (i.e. Flammable Liquid, Poison B, n.o.s.) and one of the classes meets the criteria of a Poison B - then the generic or technical name of the Poison B must be included in the basic description on shipping papers or hazardous waste manifests [ie - Waste Flammable Liquid, Poison B (or Poisonous) n.o.s. (Copper Cyanide)].
- (6) If it is specifically determined that a material/waste is not listed as a "Forbidden" material in column (3) of the Table, it does not meet the definition of any of the DOT hazard classes, is not a hazardous waste or a hazardous substance, it is not considered a hazardous material and is not subject to the requirements of the HMTR (49 CFR 172.101(c)). If however, the material/waste meets the definition of a hazardous substance(s) see the shipping name modification provisions on page II(B)-7- (entry 3) of this document.

There are certain other final clarifications regarding the use of proper shipping names included within section 172.101 which need to be pointed out. These include :

- (1) Shipping names may be used in the singular or plural and in either capital or lower case letters.
- (2) The abbreviation "n.o.i." which means "not otherwise indexed" or "n.o.i.b.n." which means "not otherwise indexed by name" may be used interchangeably with "n.o.s.".
- (3) When qualifying words such as material, pure, staining, odiferous, etc., are used as part of the proper shipping

name, their sequence on the package markings and shipping paper descriptions is optional. These qualifying words may appear between the DOT name and hazard class or after the hazard class. However, the entry in the Table reflects the preferred sequence. This modification does not apply to hazardous materials shipped as wastes. These must always be prefaced by the qualifying word "Waste" unless the word "Waste" is already included in the shipping description.

- (4) When one entry references another entry by use of the word "see," if both names are in Roman type, either name may be used as the proper shipping name (e.g. for Carbolic acid see Phenol, either may be used). However, for an organic peroxide, the technical name must be used as the proper shipping name (e.g. Benzoyl Peroxide).
- (5) When a shipping name includes a concentration range as part of the shipping description, the actual concentration may be used in place of the concentration range.
- (6) The use of the prefix "mono" is optional in any shipping name when appropriate.
- (7) The "RQ" and numbers in italics following a proper shipping name of a material identified by the letter "E" in column (1) specify, "Reportable Quantities" in pounds and kilograms; the minimum quantity of the material that constitutes an amount which must be reported, except "Hazardous Substance, liquid or solid, n.o.s." or "Hazardous Waste, liquid or solid, n.o.s.". If the hazardous constituents in the substance or waste exceed the "Reportable Quantity" limit established for those constituents, then any quantity of the hazardous substance or waste constitutes a "Reportable Quantity".

COLUMN (3): Hazard Class and UN/NA Identification Number

This column is divided into two parts headed 3 and 3(A). Column 3 identifies the hazard classes which correspond to each of the hazardous materials/wastes listed in column 2, and column 3(A) assigns a UN/NA identification number to each of the listed materials/wastes and hazard classes.

Under column 3 it is important to remember that the word "Forbidden" entirely prohibits certain materials from being offered or accepted for transportation.(49 CFR 172.101(d)). If a material meets the definition of more than one hazard class and a multiple hazard class n.o.s. description is not listed in Column 2, the correct n.o.s. shipping description must be selected by determining the hazard class given the highest priority according to the listing provided in section 173.2 (see page 43 for the Hazard Class listing). For example, a material that is both a flammable liquid and an

irritating material is not specifically identified among the multiple hazard class listings found throughout this column. The shipping description for such a material would be "Flammable liquid n.o.s., UN 1993" because a flammable liquid appears fifth on the listing in section 173.2, while an irritating material appears eleventh. (See Manifest Guidance Document for a more detailed explanation of this modification) (49 CFR 101(c)). Modifications of this particular classification or any of the other hazard classes specified in this column can be initiated by any interested persons through the submittal of new or reevaluated test data to the Office of Hazardous Materials Regulation at DOT.

As previously stated, column 3(A) assigns each hazardous material/waste a UN/NA identification number. Use of the UN/NA identification number is a new requirement included by DOT in its May 22, 1980 amendments. The numbers found in this column must be displayed by July 1, 1981 on shipping papers, manifests [§172.200 (c)]; by July 1, 1983 on packages after the proper shipping name [§172.300(c)(3)] and on orange panels or placards affixed to portable tanks, cargo tanks and tank cars by November 1, 1981 [§172.336(c)(7)]. The display of UN/NA identification numbers on multi-unit tank car tanks is not required prior to July 1, 1983 [§172.330(h)]. The purpose behind the numbering system is to improve the capability of emergency personnel to quickly identify hazardous materials/ wastes and ensure that accurate information is transmitted directly with hazardous materials/ wastes in the event of an emergency. The UN/NA identification numbers are referenced in a guidebook published by DOT, the Emergency Response Guidebook, and correspond to sections of the guidebook that inform emergency response personnel as to the appropriate actions which must be taken when different types of chemicals are spilled. The numbers are based on an international system designed by the United Nations Committee of Experts on Transportation of Dangerous Goods. They include the prefix UN and are followed by a four (4) digit number. For those materials not covered under the UN system, the DOT has also adopted the North American (NA) materials identification system. The NA numbers identify materials/wastes names not recognized for international shipment by the UN Committee, except for movements to and from Canada. The NA numbers include the prefix NA and are also followed by a four (4) digit number.

Finally, two important points should be kept in mind regarding columns 3 and 3(A). First, the hazard classes identified in column 3 should be used with Tables 1 and 2 in Section 172.504 of the HMTR for placarding purposes. They are part of a material's proper shipping description and only appear when this description is required as on shipping papers and incident reports. For example, a Class C explosive would be placarded with a Flammable placard (see Table). Tables 1 and 2 in section 172.504 of the HMTR identify the specific placards which must be affixed to vehicles shipping hazardous materials (Note: Placard requirements are addressed in II.(C)(3) of this manual).

Second, the emergency response identification numbers assigned by DOT in column 3A should not be confused with the hazardous waste identification numbers assigned by EPA. The two systems are unrelated. The DOT numbers are the numbers to be used on the manifest and for other shipping purposes, while the EPA numbers are required to be used on notification and annual report forms and for other record-keeping and reporting purposes. They may be entered on manifests/shipping papers following the basic description (49 CFR 172.201(a)(4)).

COLUMN (4): Label(s) Required

This column specifies the labels which must be applied to the outside of all packages containing hazardous materials. Although the labels specified in this column generally satisfy all of the DOT labeling requirements, section 172.402 of HMTR points out some additional labeling requirements for materials/wastes that meet the definition of more than one hazard class. (See section II C.2 of this Manual on Labeling Requirements). Thus, special care should be taken to assure that all of the DOT labeling requirements in column 4 and the multiple labeling requirements in section 172.402 are satisfied. In addition, whenever the word "NONE" appears in this column, no labels are required for the transportation of that particular material/waste. (49 CFR 172.101(f))

COLUMN (5): Packaging

This two-part column references the HMTR sections that apply to packagings. Column 5(a) highlights exceptions from the general packaging requirements outlined in column 5(b). (49 CFR 172.101(g))

The exceptions provided in 5(a) are based on limited quantity and/or small volume shipments of certain hazardous materials/wastes. The column refers to the appropriate HMTR sections which explain whether an exception for a particular material can be taken and which weight or quantity limitations exist for excepted shipments of the material. When an exception is permitted, the material/waste is usually excluded from the labels and packagings generally required in columns 4 and 5(b).

If an exception cannot be taken because the commodity to be shipped does not meet the qualifications set forth in 5(a), the packagings prescribed in 5(b) must be used to transport the material. Whenever the word "None" appears in column 5(a), no exceptions are permitted for the material and packagings listed in 5(b) must be used for any quantities shipped. (See page II E-2 for an example on how to determine proper packaging.)

COLUMN (6): Maximum Quantity in One Package

Column 6(a) specifies the quantities permitted in one package for either passenger aircraft or passenger railcars. Column 6(b) lists the maximum quantities of one

outside package permitted on cargo aircraft. Packages for air cargo must bear the CARGO AIRCRAFT ONLY label described in section 172.448 of the HMTR.

With specific regard to air transportation, any material that is "Forbidden" in 6(a) to travel on passenger-carrying aircrafts but permitted to travel on cargo aircraft must be shipped by cargo aircraft and also bear the CARGO AIRCRAFT ONLY label. This labeling requirement also applies to shipments which exceed the maximum quantity authorized for passenger aircraft but meet the cargo aircraft limits. (49 CFR 172.101(h))

COLUMN (7): Water Shipments

This column refers to the loading and stowing requirements for hazardous materials transported by water in cargo or passenger vessels. The numbers and additional information that appear in these columns (7a, 7b, and 7c) refer to the specific locations authorized and special requirements set forth in section 173.63 of the HMTR. The numbers in 7(a) and 7(b) should be interpreted as follows (49 CFR 172.101(i)):

- "1" means the material/waste may be stowed "on deck" subject to the requirements of §176.63(b). When both "on deck" and "under deck" are authorized, "under deck" should be used, if available.
- "2" means the material/waste may be stowed "under deck" in a compartment or hold subject to the requirements of §176.63(c).
- "3" means the material/waste may be stowed "under deck away from heat" in a ventilated compartment or hold subject to the requirements of §176.63(d).
- "4" means the material/waste is authorized to be transported in only the limited quantities specified in column 5(a) of the HMT and is subject to the stowage requirements specified for a cargo vessel for the same material/waste.
- "5" means the material/waste is forbidden and may not be offered or accepted for transportation.
- "6" means the material/waste is authorized to be transported in a magazine subject to the requirements of §176.135 through §176.144.

The "other requirements" listed in column 7(c) provide further specific instruction, when applicable, for loading and stowing hazardous materials aboard cargo or passenger vessels.

In summary, Section 172.101 - the HMT and modifications - should be consulted when a hazardous material is offered for transportation by any mode. The Table offers the DOT proper shipping descriptions that should be used on shipping papers/manifests and for marking and labeling purposes. These DOT shipping descriptions should also be used for hazardous wastes, since the EPA references Section 172.101 of the HMTR as their requirements as well. In addition, although a specific material/waste may not be listed in the Table, the modification section lists the procedures for properly describing that material/waste.

C. Pretransportation Requirements (Parts 172 & 173)

1. Marking (Subpart D of HMTR)

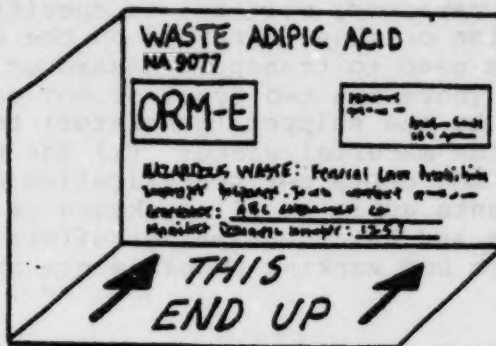
Markings under Subpart D are the application of the descriptive name, consignee or consignor name and address, UN/NA identification number (effective July 1, 1983) and Other Regulated Material (ORM) designation. Markings under Part 173 are instructions, cautions, weights, or specification marks or any combination of these markings on the outside of containers or packages used to transport hazardous materials or hazardous wastes. There are two types of DOT markings which must be applied by the shipper (generator) to all shipments of a hazardous material/waste: (1) The DOT package markings; and (2) the DOT container specification markings.

The DOT requirements apply to all packages or containers of hazardous materials and hazardous wastes offered for transportation. These basic DOT marking requirements are as follows:

- (1) Packages must be marked with the proper shipping name and UN/NA identification number as listed in the Hazardous Materials Table (HMT) of section 172.101. Hazardous materials and wastes packaged in portable tanks, cargo tanks and tank cars or shipped under the Limited Quantity exception are exempted from this portion of the regulations. (49 CFR 172.300)
- (2) Packages of a hazardous material/waste offered for export by water and described by a "N.O.S" entry in §172.101 must have the technical name of the material added in parenthesis immediately following the proper shipping name. (49 CFR 172.302)
- (3) Markings must be durable, in English, and printed on or affixed to the surface of the hazardous material/ waste container, or on a tag, label or sign. (49 CFR 172.304)
- (4) Markings must be displayed on backgrounds of sharply contrasting colors, unobscured by labels or attachments, and located away from other markings such as advertisements which could reduce their effectiveness. (49 CFR 172.304)
- (5) ORM - markings. (49 CFR 172.316)
- (6) Packages must be marked with the names and addresses of the consignee or consignor, except when they are transported by highway and will not be transferred between different motor carriers; or part of a carload lot, truckload lot or freight container load and the entire contents of the rail car, truck or freight container are tendered from one

consignor to one consignee; or transported by portable tank, cargo tank or tank car. (49 CFR 172.306) (Note: see section II F.4 on Transportation by Highway for requirements for motor carriers).

Figure II - Illustrative example of proper marking according to DOT regulations.



Containers which have been constructed to meet DOT specifications, must be marked as follows:

- (1) Letters and numerals identifying the container specifications in an unobstructed area. (49 CFR 173.24(c))
- (2) The name and address, or symbol of the person affixing such a mark. Symbols, however, must first be registered with the Materials Transport Bureau. (49 CFR 173.24(c))
- (3) Markings must be in letters and numerals at least 1/2" high and stamped embossed, burned, printed or otherwise marked on the package to provide accessibility and permanency so they are readily apparent and can be understood. (49 CFR 173.24(c))

Table C-1 (next page) shows other pertinent DOT marking regulations applicable to both hazardous materials and hazardous waste transportation.

In addition to the two DOT marking requirements, Section 262.32 of the EPA Hazardous Waste Regulations, requires a generator to mark each hazardous waste package or container of 110 gallons or less with the following words and information:

HAZARDOUS WASTE - Federal Law Prohibits Improper Disposal. If found, contact the nearest police or public safety authority or the U.S. Environmental Protection Agency.
Generator's Name and Address _____
Manifest Document Number _____

Table C-1 Additional Marking Regulations

<u>Topic</u>	<u>Subject</u>	<u>Title 49 Section</u>
Authorized abbreviations	Regulations with regard to use of abbreviations for the marking descriptions	172.308
Radioactive materials	Additional marking requirements for specific types of radioactive materials and packagings	172.310
Liquid Hazardous materials	Markings requirements for liquid hazardous materials	172.312
Packagings containing materials Classified as ORM	Markings requirements for Other Regulated Materials A, B, C, D, & E	172.316
Portable Tanks	Marking requirements for lettering portable tanks	172.326
Cargo Tanks	Required markings for cargo tanks	172.328
Tank Cars	Marking requirements and exceptions for tank cars	172.330
Shipping Container Specifications	Marking requirements are listed throughout this part for the various shipping containers to certify that they were constructed to DOT specifications	Part 178
Specifications for Tank Cars	Each tank car should be plainly and permanently marked to certify that the tank complies with the DOT specifications	Part 179

2. Labeling (Subpart E of HMTR)

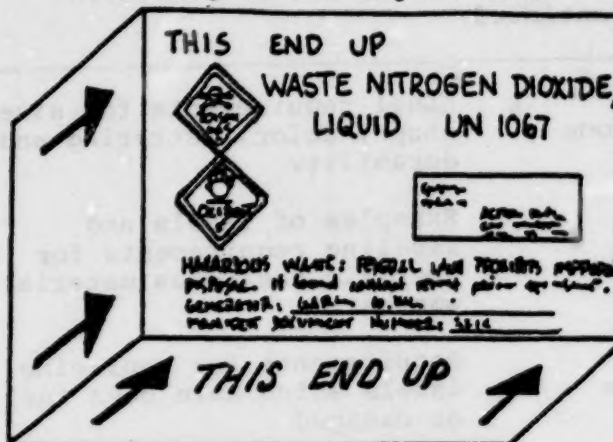
A hazardous material transportation label is a color-coded square-on-point with a hazardous warning written and illustrated upon it. It must be attached directly to a package or container carrying a hazardous material/waste. Labels identify the principal hazard(s) associated with a material/waste being shipped. Thus, their placement on a package or container helps to alert transportation personnel of the potential hazards of a material or waste.

Every shipper (generator) who offers a package, overpack or freight container containing a hazardous material/waste for transportation must affix to it the label(s) prescribed for the material/waste, according to column 4 of the Hazardous Materials Table of section 172.101. In addition, section 172.402 specifies certain multiple labeling requirements when materials/wastes of different hazard classes are shipped within single packages or containers. Once a shipper (generator) affixes the proper labels to a package, and verifies that all packages and containers have been correctly identified, classed, marked and labeled it then becomes the responsibility of each carrier (transporter) to accept the verification unless obvious errors or omissions are detected, and to assure all missing, torn or improper labels are replaced.

All DOT labels must meet certain general requirements, such as uniform specifications and proper placement. These requirements are outlined in the HMTR as follows:

- (1) Labels must be printed on or affixed to the surface of a package near the proper shipping name marked in accordance with Subpart D of the HMTR. (49 CFR 172.406(a))
- (2) Labels may be printed or placed on a securely affixed tag, or by some other suitable means under certain conditions. (49 CFR 172.406(b))
- (3) Labels must be affixed to a background of a contrasting color, or must have a dotted or solid line outer border. In addition, DOT prohibits the use of any packagings which bear markings or labels of a color, design or shape which might be confused or in conflict with the DOT labels prescribed. (49 CFR 172.401(b), 49 CFR 172.406(d))
- (4) Labels may contain additional identification information, including the name of a generator or producer, provided that the information is printed outside of the solid line inner border and is in type no larger than 10 points or 1/8 of an inch. (49 CFR 172.407(f))

Figure III - Illustrative example of proper labeling according to DOT regulations.



It is important to remember that hazardous materials/wastes shipped under the Limited Quantity exception are not required to display the DOT labels. To determine whether a particular material/waste qualifies for this exception, a shipper (generator) must consult the Table in section 172.101, column 5(a). In addition, a hazardous waste which does not meet the definition of a DOT hazard class other than the ORM-E classification must be marked, instead of labeled, as prescribed in section 172.316 of the HMTR and section 262.32 of the Hazardous Waste Regulations. (See Appendix II for definitions of the DOT hazard classes.)

Finally, the following table lists the DOT regulations applicable to labeling:

Table C-2 Hazardous Materials/Waste Labeling Regulations

		Title 49
<u>Topic</u>	<u>Subject</u>	<u>Section</u>
General Labeling Requirements	Labeling requirements and exceptions, under DOT regulations	172.400
Prohibited Labeling	Labeling restrictions and exemptions	172.401
Specialized labeling requirements	Labeling requirements for mixed and consolidated shipments; and specialized labels	172.402/ 404
Placement of Labels	General requirements and exemptions for the placement of labels on packagings containing hazardous materials	172.406

Table C-2 continued

Label Specifications	Label requirements for size, shape, color, lettering and durability	172.407
Examples	Examples of labels and labeling requirements for specific hazardous materials/wastes	172.403 172.405 172.411-450
Replacement Requirements	Requirements for replacing labels which have been lost or damaged	174.33, 175.40, 176.33 & 177.815

3. Placarding (Subpart F of HMTR)

A DOT placard is a color-coded sign which includes a written and illustrated warning that is designed to identify the hazard(s) associated with a material/waste being transported. All motor vehicles, rail cars and freight containers carrying a hazardous material/waste identified in Table 1 or over 1000 lbs. of those identified in Table 2 must be placarded on each end and on each side with the type of placard specified in either Table 1 or Table 2 of section 172.504 as appropriate for the material/waste being carried. The primary purpose of the placards is to alert (1) personnel involved with the transport of hazardous materials/waste, (2) emergency response teams called to the scene of a hazardous material/waste incident, and (3) the general public against the potential hazards of a material or waste.

The tables in section 172.504 specify which placard or combinations of placards must be used for the transportation of hazardous materials/wastes. The type of placard required depends upon the hazard class assigned to the material/waste in column (3) of the Hazardous Materials Table of section 172.101. For example Table 1 (below) lists five (5) hazard classes.

Table I - List of DOT hazard classes always requiring placarding, and the corresponding placard notations.

TABLE 1	
If the motor vehicle, rail car, or freight container contains a material classed (described) as—	The motor vehicle, rail car, or freight container must be placarded on each side and each end—
Class A explosives.....	EXPLOSIVES A. ¹
Class B explosives.....	EXPLOSIVES B. ¹
Poison A.....	POISON GAS. ¹
Flammable solid (DANGEROUS WHEN WET label only).....	FLAMMABLE SOLID W. ¹
Radioactive material.....	RADIOACTIVE. ^{1,2}
Uranium hexafluoride, fissile (containing more than 0.7 pct U ²³⁵).....	RADIOACTIVE ¹ AND CORROSIVE. ³
Uranium hexafluoride, low specific activity (containing 0.7 pct or less U ²³⁵).....	RADIOACTIVE ¹ AND CORROSIVE. ³

¹See § 172.510(a).

²EXPLOSIVES B placard not required if the freight container, motor vehicle, or rail car contains class A explosives and is placarded EXPLOSIVES A as required.

³FLAMMABLE SOLID "W" placard is required only when the DANGEROUS WHEN WET label is specified in § 172.101 for a material classed as a Flammable solid.

⁴Applies only to any quantity of packages bearing the RADIOACTIVE YELLOW III label. (See § 172.403.)

⁵See §§ 173.389(c) and 173.389(e), for full-load shipments of radioactive materials meeting the definition of low specific activity when transported pursuant to § 173.302(b).

⁶CORROSIVE placard not required for shipments of less than 1000 pounds gross weight.

Listed across from the hazard classes are the DOT placards which must be used to transport a material/waste described by any one of these classes.

Figure IV - Representative section from the Hazardous Materials Table.

§ 172.101 Hazardous Materials Table—Continued

(1) +/ E/ A/ W	(2) Hazardous materials descriptions and proper shipping names	(3) Hazard class	(4A) Identification number	(4B) Label(s) required (if not excepted)	(5) Packaging		(6) Maximum net quantity in one package		(7) Water shipments		
					(a) Exceptions	(b) Specific requirements	(a) Passenger carrying aircraft or railcar	(b) Cargo only aircraft	(a) Cargo vessel	(b) Passenger vessel	(c) Other requirements
W	Petroleum coke (uncalcined)	ORM-C		None	173.506	173.1045			1.2	1.2	Not permitted if temperature of material is at or above 130 deg F
	Petroleum crude. See Crude oil										
	Petroleum distillate	Combustible liquid	UN1268	None	173.118a	None	No limit	No limit	1.2	1.2	
	Petroleum distillate	Flammable liquid	UN1268	Flammable liquid	173.118	173.119	1 quart	10 gallons	1.2	4	
	Petroleum ether	Flammable liquid	UN1271	Flammable liquid	173.118	173.119	1 quart	10 gallons	1.2	4	
	Petroleum gas, liquefied. See Liquefied petroleum gas										
	Petroleum naphtha	Combustible liquid	UN1265	None	173.118a	None	No limit	No limit	1.2	1.2	
	Petroleum naphtha	Flammable liquid	UN1265	Flammable liquid	173.118	173.119	1 quart	10 gallons	1.2	1	
A	Phenacapon	ORM-A	NA2783	None	173.506	173.510	No limit	No limit	1.2	1.2	
+ E	Phenol (RQ-1000/454)	Poison B	UN1671	Poison	173.364	173.369	50 pounds	250 pounds	1.2	1.2	
E	Phenol, liquid or solution (liquid tar acid containing over 50% phenol) (RQ-1000/454)	Poison B	NA2921	Poison	173.345	173.349	1 quart	55 gallons	1.2	1.2	
	Phenoxy pesticide, liquid, n.o.s. (compounds and preparations)	Flammable liquid	UN2766	Flammable liquid	173.118	173.119	1 quart	10 gallons	1.2	1	
	Phenoxy pesticide, liquid, n.o.s. (compounds and preparations)	Poison B	UN2766	Poison	173.345	173.346	1 quart	55 gallons	1.2	1.2	
	Phenoxy pesticide, solid, n.o.s. (compounds and preparations)	Poison B	UN2766	Poison	173.364	173.365	50 pounds	200 pounds	1.2	1.2	
A	Phenylenediamine, meta or para, solid	ORM-B	UN1673	None	173.506	173.510	No limit	No limit	1	5	
	Phenyldichloroarsine	Poison B	NA1656	Poison	None	173.355	Forbidden	80 gallons	1	5	
	m-Phenylenediamine (dry)	Forbidden	UN1804	Corrosive	None	173.280	Forbidden	10 gallons	1	1	Keep dry
	Phenyltrichlorosilane	Corrosive material	UN1804	Corrosive	None	173.280	Forbidden	10 gallons	1	1	
	Phenylurea pesticide, liquid, n.o.s. (compounds and preparations)	Flammable liquid	UN2766	Flammable liquid	173.118	173.119	1 quart	10 gallons	1.2	1	
	Phenylurea pesticide, liquid, n.o.s. (compounds and preparations)	Poison B	UN2767	Poison	173.345	173.346	1 quart	55 gallons	1.2	1.2	
	Phenylurea pesticide, solid, n.o.s. (compounds and preparations)	Poison B	UN2767	Poison	173.364	173.365	50 pounds	200 pounds	1.2	1.2	
	Phosgene (diphosphene) (RQ-5000/2270)	Poison A	UN1076	Poison gas	None	173.533	Forbidden	Forbidden	1	5	Regregation same as for flammable gases
E	Phosphine	Poison A	UN2199	Poison gas and flammable gas	None	173.528	Forbidden	Forbidden	1	5	

A material such as Phosphine is described in column (3) of the Hazardous Materials Table of §172.101 (above) as a Class A Poison. According to Table 1 of §172.504, a poison A requires the POISON GAS placard.

The hazard class of the material/waste always determines which of the Tables to use in section 172.504. Table 1 lists five DOT hazard classes, while Table 2 lists the remaining classes. It is important to remember that any material/waste which falls under the hazard classes listed in Table 1 will always require placarding, regardless of the quantity shipped. This DOT regulation includes small quantity generators of hazardous wastes who may be excluded from the RCRA regulations under §261.5, but subject to the DOT placarding requirements when any one of the wastes to be transported exhibits the characteristics of a hazard class specified in Table 1. In addition, a DANGEROUS placard (discussed on next page) may never be substituted for the placards designated in Table 1 when combinations of materials/wastes are shipped.

Table II - List of DOT hazard classes requiring placarding under certain conditions (see text), and the corresponding placard notations.

If the motor vehicle, rail car or freight container contains a material classed (described) as—	The motor vehicle, rail car, or freight container must be placarded on each side and each end—
Class C explosives.....	DANGEROUS. ^{1,9}
Blasting agents.....	BLASTING AGENTS. ^{1,9}
Nonflammable gas.....	NONFLAMMABLE GAS. ²
Nonflammable gas (Chlorine).....	CHLORINE. ³
Nonflammable gas (Fluorine).....	POISON.
Nonflammable gas (Oxygen, pressurized liquid).....	OXYGEN. ⁴
Flammable gas.....	FLAMMABLE GAS. ⁵
Combustible liquid.....	COMBUSTIBLE LIQUID. ^{1,1}
Flammable liquid.....	FLAMMABLE.
Flammable solid.....	FLAMMABLE SOLID. ⁵
Oxidizer.....	OXIDIZER. ^{1,10}
Organic peroxide.....	ORGANIC PEROXIDE.
Poison B.....	POISON.
Corrosive material.....	CORROSIVE. ⁶
Irritating material.....	DANGEROUS.

¹Applies only to a class C explosive required to be labeled with an EXPLOSIVE C label.

²OXYGEN placards may be used to identify liquefied pressurized oxygen contained in a manner so it does not meet the definition in sec. 173.300 of this subchapter.

³COMBUSTIBLE placard required only when a material classed as a combustible liquid is transported in a packaging having a rated capacity of more than 110 gallons, a cargo tank, or a tank car.

⁴A FLAMMABLE placard may be used on a cargo tank and a portable tank during transportation by highway and water.

⁵Except when offered for transportation by water, a FLAMMABLE placard may be displayed in place of a FLAMMABLE SOLID placard except when a DANGEROUS WHEN WET label is specified for the material in sec. 172.101. (See table 1, this section.)

⁶See § 173.245(b) of this subchapter for authorized exemptions.

⁷CHLORINE placard required only for a packaging having a rated capacity of more than 110 gallons; the NON-FLAMMABLE GAS placard for packagings having a rated capacity of 110 gallons or less.

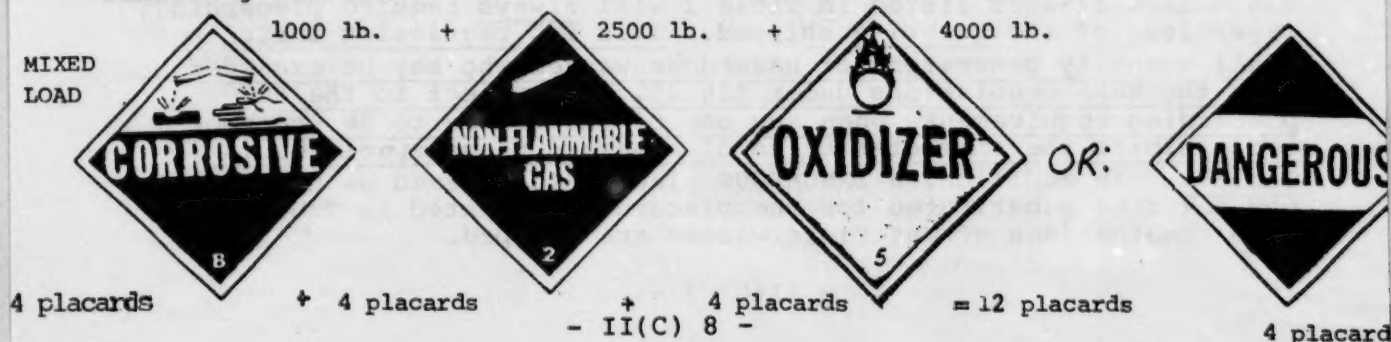
⁸A NON-FLAMMABLE GAS placard is not required on a motor vehicle displaying a FLAMMABLE GAS placard.

⁹BLASTING AGENTS, OXIDIZER and DANGEROUS placards need not be displayed if a freight container, motor vehicle, or rail car also contains Class A or Class B explosives and is placarded EXPLOSIVES A or EXPLOSIVES B as required.

¹⁰Except for shipments by water, OXIDIZER placards need not be displayed if a freight container, motor vehicle or rail car also contains blasting agents and is placarded BLASTING AGENT as required.

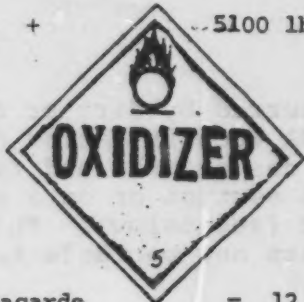
[Amdt. 172-29, 41 FR 15996, Apr. 15, 1976, as amended by Amdt. 172-29A, 41 FR 40679, Sept. 20, 1976; Amdt. 172-29B, 41 FR 57067, Dec. 30, 1976; Amdt. 172-48, 44 FR 31182, May 31, 1979; Amdt. 172-58, 45 FR 34701, May 22, 1980; 45 FR 46421, July 10, 1980]

On the other hand, the placards specified in Table 2 (above) are only required for shipments of materials/wastes weighing 1000 lbs. (454 kilograms) or more. Exceptions to this weight limit are listed in the footnotes below Table 2. Also, the DANGEROUS placard may be used in lieu of the specified placards for combined shipments of materials/wastes under Table 2, provided that the total weight of any one material/waste loaded at one location in the mixed load does not exceed 5000 lbs (2273 kilograms). In the event that one of the materials/wastes in the mixed load does exceed 5000 lbs, then a separate placard would be required for that material/wastes. However, the DANGEROUS placard could still be displayed for the remaining materials in the load. For example:



FIXED
LOAD

1000 lb. + 2500 lb. + 5100 lb.

4 placards + 4 placards + 4 placards = 12 placards OR:

4 placards + 4 placards = 8 placards

(Note: The following hazard classes are not regulated under Tables 1 & 2 : ORM A,B,C,D & E; Etiological Agents)

Placarding hazardous materials/wastes is the joint responsibility of the shipper (generator) and the carrier (transporter). Each person who offers a hazardous material/waste for transport by highway must provide the carrier (transporter) with the placards required for the material/waste prior to or at the time it is offered for transport, unless the carrier's (transporter's) vehicle is already properly placarded for the material/waste. In the case of rail shipments, the shipper must affix the placards required to the rail car containing the hazardous material/waste, unless the motor vehicle, transport container or portable tank on the rail car is already properly placarded. No rail carrier (transporter) may accept a rail car containing a hazardous material/waste for transport, unless the necessary placards are in place.

All placards required on motor vehicles, rail cars and freight containers must be readily visible. They must be located away from apparatus such as ladders, pipes and doors, and be clear of any marking such as advertising which could substantially reduce their effectiveness. In addition, placards should be securely affixed and maintained in such a manner that the format, legibility, color and visibility are not damaged, deteriorated

or obscured by dirt or other matter. The hazardous material/waste UN or NA identification numbers must also be displayed on portable tanks, cargo tanks and tank cars, either on the placard designated in this section or on a separate orange panel described in section 172.332 (see below). This requirement applies only to cargo tanks, tank cars and portable tanks on and after November 1, 1981.

Table C - Identification Number Display

<u>Topic</u>	<u>Subject</u>	<u>Title 49 Section</u>
Prohibited Display	Display alternatives	172.334
General Display Requirements	Display specifications	172.332
Portable Tanks	Display requirements for portable tanks	172.326
Cargo Tanks	Display requirements for cargo tanks	172.328
Tank Cars & Multi-Unit Tank Car Tanks	Display requirements for tank cars and multi-unit tank car tanks	172.330

(1) Orange Panel



Note: This panel must appear in conjunction with the DOT placard specified for the material in Table 1 or 2 of §172.504

(2) DOT Specification Placard with ID Number



The following Table identifies other important placarding requirements for the transportation of hazardous materials/wastes:

Table C-3 Other Hazardous Materials/Waste Placarding Requirements

<u>Topic</u>	<u>Subject</u>	<u>Title 49 Section</u>
Prohibited Placarding	Placarding restrictions	172.502
General Placarding Requirements	Placarding requirements by class of hazardous material/waste and quantity	172.500 172.504
Placarding for Rail Shipment	Special rail placarding requirements Empty Placard	172.508 172.510
Placarding for Highway Shipment	Responsibility of shipper and transporter	172.506
Freight Containers	Placarding requirements and exceptions for freight containers	172.512
Cargo Tanks and Portable Tanks	Placarding requirements and exceptions for cargo and portable tanks	172.514
Visibility and Display of Placards	Requirements for the proper display of hazardous materials/waste placards	172.516
General Specification for Placards	General requirements for designing, manufacturing and lettering hazardous material/waste placards	172.519
Specifications for Placard Type	Specifications for and examples of specific types of hazardous material/waste placards	172.521 558

D. Shipping Papers/Manifest (Part 172, Subpart C of the HMTR)

DOT requires that any person who offers a hazardous material for transportation must describe the material on a shipping paper according to Part 172 of the HMTR. There are, however, certain exceptions to this rule. Other Regulated Materials (ORM) A, B & C need not be described on the shipping paper in the manner required by Part 172, Subpart C unless they are to be transported by air or water. On the other hand, an ORM-D material must always be described in the manner required under this part unless it is to be transported by air. (49 CFR 172.200(b))

A DOT shipping paper may take on any number of forms. It may be a shipping order, a bill of lading, a manifest or another shipping document, provided that it includes the following information:

- (1) The proper shipping name of the hazardous material as it is listed in the Hazardous Materials Table of section 172.101. (49 CFR 172.202(a))
- (2) The hazard class prescribed for the material in the Hazardous Materials Table. The hazard class, however, need not be included when the words of the proper shipping name contain the key word or words of the class and the shipping name contains only one hazard class. For instance, a material with the proper shipping name "Poison B, liquid" would not require the hazardous class entry. (49 CFR 172.202(a))
- (3) The identification number preceded by UN or NA, as appropriate, assigned to the material in the Table. (49 CFR 172.202(a))
- (4) The hazardous material description outlined in (1), (2) and (3) above must appear on the shipping paper in the following sequence: proper shipping name, hazardous class, UN/NA ID number. For example, "Gasoline, Flammable liquid, UN 1203". (49 CFR 172.202(b))
- (5) The total quantity of the hazardous material described on the shipping paper must be cited by weight, volume or as otherwise appropriate either before or after, or both before and after the materials proper shipping description. (49 CFR 172.202(c))
- (6) A certification by the person who offers the hazardous material for transport, stating, "This is to certify that the above-named (or herein-named) materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation".

Exceptions to and variations of this certification are listed in section 172.204 of the HMTR. (49 CFR 172.204)

- (7) The type of packaging used to transport the material may be entered in any appropriate manner or by using abbreviations such as "40 Cyl. Nitrogen, Nonflammable gas, UN 1066, 800 pounds" or "1 box Cement, liquid, N.O.S., Flammable liquid, NA 1133, 25 lbs." (49 CFR 172.202(c))

In addition to the foregoing information, a shipping paper may be required to include certain other information, depending upon the mode of transportation used, the material being shipped or the circumstances surrounding certain specified shipments. These additional description requirements are discussed in the Manifest Guidance Document also published by the Office of Solid Waste, EPA.

For the transportation of hazardous wastes, DOT specifies in §172.205 that no person may offer, transport, transfer or deliver a hazardous waste unless it is accompanied by a manifest prepared in accordance with the EPA Hazardous Waste Regulations, 40 CFR Part 262. It must be carried by the transporter in the same manner as required for shipping papers in sections 174.24 (Rail), 175.35 (Aircraft), 176.24 (Vessel), and 177.817 (Highway). It must also contain much of the same information required for shipping papers, such as:

- Type of Container
- Proper DOT shipping name
- DOT Hazard Class
- UN or NA Identification number
- Exception Information (when applicable)
- Exemption Numbers (when applicable)
- Quantity or Volume
- Shippers Certification

The hazardous waste manifest, however, requires five additional items not required on a DOT shipping paper. These include:

- (1) A manifest document number which is a serially increasing number typed, printed or written on all copies of the manifest.
- (2) The generator's name, mailing address, telephone number, and EPA identification number.
- (3) The name and EPA identification number of each transporter.
- (4) The name, address and EPA identification number of the designated treatment, storage or disposal facility, and alternate facility, if one is provided.

- (5) The EPA certification which states, "This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation and the EPA."

Thus, it is important to remember that while a manifest may serve as a shipping paper, a shipping paper may not be used as a manifest to transport hazardous wastes unless it includes the additional information required by EPA - i.e., a manifest must contain the information required by EPA as well as all the information required on a shipping paper. (NOTE: See Manifest Guidance Document for a more detailed explanation on how to prepare the manifest.)

E. Packaging (Parts 173, 178, 179 of the HMTR)

The RCRA regulations require that all generators of hazardous wastes transport their wastes in packagings which are in accordance with the DOT shipping and packaging regulations in Part 173, 178 and 179 of Title 49. Part 173 of the regulations addresses the General Requirements for Shipments and Packagings of Hazardous Materials, while Parts 178 and 179 outline in detail the specifications for both shipping containers and tank cars, respectively.

In deciding which DOT shipping and packaging regulations apply to a particular material/waste, it is important to first determine the DOT proper shipping name and hazard class which accurately describes the material/waste. The DOT packaging regulations are developed to correspond with the types of hazard(s) a materials/waste potentially presents once it is offered for transportation. Since it is the hazard class of the material/waste which actually determines the packagings to be used for a shipment, it is, therefore, essential that every material/waste be properly named and classed according the DOT requirements. If any uncertainty remains regarding the DOT proper shipping name and hazard class system, refer to sections B and C of this Manual and the Manifest Guidance Document for a complete explanation.

Once the proper shipping name and hazard class of a particular material/waste has been ascertained, column 5 of the Table in section 172.101 of the HMTR will identify the specific packaging regulations which apply to that material/waste. Column 5(a) specifies whether any exceptions may be taken for limited quantity shipments and column 5 outlines the general packaging requirements for non-excepted shipments of the material/waste. In addition, column 6 and 7 highlight any further restrictions that may be placed on the transportation of the material/waste by aircraft, passenger rail or vessel.

For example, the Table classes Hydrofluoric acid solution as a "Corrosive" material.

Figure V - Representative section from The Hazardous Materials Table.

§ 172.101 Hazardous Materials Table—Continued

(1) +/ H/ A/ W	(2) Hazardous materials descriptions and proper shipping names	(3) Hazard class	(3A) Identification number	(4) Label(s) required (if not excepted)	(5) Packaging		(6) Maximum net quantity in one package		(7) Water shipments			
					(a) Exceptions	(b) Specific requirements	(a) Passenger carrying aircraft or railroad	(b) Cargo only aircraft	(a) Cargo vessel	(b) Passenger vessel	(c) Other requirements	
+ E	Hydrocyanic acid solution, less than 5% hydrocyanic acid (RQ-10/4.50)	Poison B	UN1019	Poison	None	173.331	Forbidden	25 pounds	1	3	Shade from radiant heat	
E	Hydrofluoric acid, anhydrous. See Hydrogen fluoride											
→ E	Hydrofluoric acid solution (RQ-5000/2270)	Corrosive material	UN1790	Corrosive	173.344	173.344	1 quart	1 gallon	1	4		
E	Hydrofluoric and sulfuric acid mixture (RQ-5000/2270)	Corrosive material	UN1790	Corrosive	None	173.390	Forbidden	1 gallon	1	3		
	Hydrofluoroboric acid. See Fluoboric acid											
	Hydrofluoroacetic acid	Corrosive material	NA1779	Corrosive	None	173.360	1 quart	1 gallon	1.2	1.2		

Column 5 above references the HMTR sections which delineate the specific packaging requirements for this corrosive material. Column 5(a) lists section 173.244 and column 5(b) lists section 173.264.

§ 173.244 Limited quantities of corrosive materials.

(a) Limited quantities of corrosive materials for which exceptions are permitted as noted by reference to this section in § 172.101 of this subchapter are excepted from labeling (except when offered for transportation by air) and specification packaging requirements when packed according to the following paragraphs. In addition, shipments are not subject to Subpart F of Part 172 of this subchapter, to Part 174 of this subchapter except § 174.24 and to Part 177 of this subchapter except § 177.817.

(1) Corrosive liquids in bottles having a rated capacity not over 16 ounces by volume each enclosed in a metal can packed in strong outside packaging.

(2) Corrosive liquids in metal or plastic containers having a rated capacity not over 16 ounces by volume in strong outside packaging.

(3) Corrosive solids in earthenware, glass, plastic, or paper containers of not more than 5 pounds capacity each packed in metal, wooden or fiberboard outside packaging not exceeding 25 pounds net weight each.

(4) Corrosive solids in metal, rigid fiber or composition cans or cartons or rigid plastic containers; of not more than 10 pounds capacity each, overpacked in metal, wooden or fiberboard outside containers not exceeding 25 pounds net weight each.

(b) Special exceptions for shipment of certain corrosive materials in the ORM-D class are provided in Subpart N of this part.

Section 173.244 (shown above) lists the special conditions for which hydrofluoric acid solution may be shipped as an excepted material/waste. If it is to be shipped in any of the limited quantities mentioned in (1) through (4), then the hydrofluoric acid solution would not require the corrosive label specified in Column 4 nor the specification packaging required in Column 5(b).

If, on the other hand, the shipment of hydrofluoric acid exceeds any of the small quantity limitations in 5(a), it must be labeled as required and shipped according to the specifications in § 173.264 (shown below).

§ 173.264 Hydrofluoric acid; White acid.

(a) Hydrofluoric acid and white acid (ammonium bifluoride and hydrochloric acid mixture), each must be packed in specification packaging as follows:

(1) Specification 15A, 15B, 15C, 16A, or 19A (§§ 178.168, 178.69, 178.170, 178.185, 178.190 of this subchapter). Wooden boxes with inside containers which are hydrofluoric acid resistant. These containers are authorized only for strengths of acid for which they are adequate, but in no case may the strength of acid exceed 70 percent.

(2) Specification 12B (§ 178.205 of this subchapter). Fiberboard boxes with Specification 2E (§ 178.24a of this subchapter) inside polyethylene bottles or inside receptacles of not over 1 pound capacity each, made of natural rubber, lead, or other hydrofluoric re-

sistant plastic. Authorized only for acid not over 70 percent in strength.

(3) Spec. 18D (§ 178.187 of this subchapter). Wirebound wooden overwrap, with inside spec. 2T (§ 178.21 of this subchapter) polyethylene container. Authorized for hydrofluoric acid not over 70 percent strength.

(4) Specification 12A or 12B (§§ 178.210, 178.205 of this subchapter). Fiberboard boxes with not more than four Specification 2E (§ 178.24a of this subchapter) inside polyethylene bottles, having a minimum thickness of 0.030 inch and not over 1 gallon (nominal) capacity each. Bottle closures must be made secure by sealing with pressure-sensitive plastic tape or other equally efficient means. Authorized for acid not over 70 percent strength. Authorize

The Table also identifies certain shipping requirements for Hydrofluoric acid.

Figure VI - Representative section from The Hazardous Materials Table.

§ 172.101 Hazardous Materials Table—Continued

(1) +/ E/ A/ W	(2) Hazardous materials descriptions and proper shipping names	(3) Hazard class	(4A) Identification number	(4B) Label(s) required (if not excepted)	(5) Packaging		(6) Maximum net quantity in one package		(7) Water shipments		
					(a) Exceptions	(b) Specific requirements	(a) Passenger carrying aircraft or railcar	(b) Cargo only aircraft	(a) Cargo vessel	(b) Passenger vessel	(c) Other requirements
+ R	Hydrocyanic acid solution, less than 3% hydrocyanic acid (RQ-10/4.34)	Poison B	UN1619	Poison	None	173.351	Forbidden	35 pounds	1	5	Shade from radiant heat
E	Hydrofluoric acid, anhydrous. See Hydrogen fluoride	Corrosive material Corrosive material	UN1790	Corrosive	173.344	173.364	1 quart	1 gallon	1	4	
E	Hydrofluoric acid solution (RQ-3000/2270)		UN1798	Corrosive	None	173.390	Forbidden	1 gallon	1	5	
W	Hydrofluoric and sulfuric acid mixture (RQ-490/2270)										

Column 6(a) specifies that hydrofluoric acid solution may not be shipped in passenger carrying aircraft or railcars in outside packagings containing more than one (1) quart of the material. Cargo aircraft, however, may transport the hydrofluoric acid solution in outside packages holding up to one (1) gallon, as indicated in column 6(b). Column 7 outlines the loading and storing requirements for shipments by water. A "1" in column 7(a) means that the hydrofluoric acid may be stored "on deck", provided that it is shipped by cargo vessel. A "4" in column 7(b) limits the transportation of this material/waste by passenger vessel to small quantities identified in column 5(a). The small quantity shipment may then be stored in the same manner as specified for a cargo vessel.

In addition to the packaging requirements pointed out in the Table, Part 173 includes the basic packaging requirements applicable to all shipments of hazardous materials/ wastes.

1. General Packaging Requirements (Subpart A of the HMTR)

This part of the regulations defines hazardous materials for transportation purposes and prescribes certain requirements which must be observed in preparing them for shipment. Materials are defined in terms of their hazard classes. Packagings and shipping instructions are designed to correspond with these classifications.

Section 173.2 lists the hazard classes in a priority order based on the extent of danger a material may present in transportation whenever it exhibits certain hazardous characteristics. Any hazardous material having more than one hazard as defined in this part of the regulations (for definition of hazard classes see Appendix II) must be classed and packaged according to the following order of hazards:

- | | |
|---------------------------------|---|
| (1) Radioactive material | (10) Corrosive material (solid) |
| (2) Poison A | (11) Irritating materials |
| (3) Flammable Gas | (12) Combustible liquid (in containers more than 110 gallons) |
| (4) Non-flammable Gas | (13) ORM-B |
| (5) Flammable liquid | (14) ORM-A |
| (6) Oxidizer | (15) Combustible liquid (in containers less than 110 gallons) |
| (7) Flammable Solid | (16) ORM-E |
| (8) Corrosive material (liquid) | |
| (9) Poison B | |

For instance, a material/waste that is both a flammable gas and an irritating material must be classed and packaged according to the requirements of a flammable gas because it appears third on the list, while an irritating material appears eleventh. This listing, however, will not apply to materials/wastes specifically identified in the hazardous material table §172.101 as:

Explosives, see §173.86

Blasting Agents, see §173.114(a)

Etiological Agents, see §173.386

Organic Peroxide, see §173.151(a)

Such materials/wastes must be classed and packaged according to the special requirements delineated in the regulation sections mentioned above.

Other general regulations applicable to all packagings and shipments are listed in Table E-1.

Table E-1 General Regulations for Packagings

<u>TITLE</u>	<u>SUBJECT</u>	<u>SECTION</u>
Purpose & Scope	Purpose & scope of the packaging regulations	173.1
Classification of a material having more than one hazard class	Hierarchy of hazard classes	173.2
Packaging & exceptions	Methods of manufacture & packagings for leaking containers	173.3

Table E-1 continued

Shipments by Air	Additional requirements for packagings used for air transport	173.6
US Government material	Special requirements for hazardous materials sent by US government	173.7
Canadian Shipments packagings	Shipments of hazardous material into the US from Canada	173.8
Prohibited Packaging	Restrictions on packaging	173.21
Standard Requirements for all packages	General packing requirements	173.24

2. Preparation of Hazardous Materials for Transportation (Subpart B)

Before offering a hazardous material/waste for transportation, a shipper (generator) must be certain that packages and containers meet all of the packaging and shipping requirements of the HMTR. Section 173.22 outlines the shipper's (generator's) responsibilities for the packaging of hazardous materials/wastes. A shipper (generator) must determine that all containers used are assembled with all parts or fittings in their proper place and properly secured and marked in accordance with the applicable specifications prescribed in Parts 178 and 179. In determining whether a specification container is manufactured in accordance with the applicable specifications, the shipper (generator) may accept a manufacturer's certification or specification marking. The shipper (generator) must also be certain that the packagings used are not of the type prohibited in Section 173.21 of the HMTR.

In addition, a shipper (generator) may also apply for a DOT exemption allowing him to use a container or package other than the one required for a particular material. An exemption authorizes a single shipper (generator) to transport a hazardous material/waste which may not be included under the HMTR or to use for a specified length of time a container which is not specifically authorized by DOT. A DOT exemption is only provided when the shipper (generator) is able to show that his proposal achieves a level of safety at least equal to that specified in the regulation from which the exemption is

sought. If the regulations do not contain a specified level of safety, the proposal must then be "consistent with the public interest and adequately protect against risks to life and property." (49 CFR 107.101) Applications for the DOT packaging exemption or for a renewal after the exemption has expired must be made in accordance with §§107.103(new) and 107.105(renewal), and be presented to the Office of Hazardous Materials Regulation, DOT. Remember, however, a DOT exemption from a certain packaging requirement does not necessarily exclude the shipper (generator) from the manifest/shipping paper, labeling, marking or placarding requirements of DOT or EPA.

Along with the basic responsibilities outlined above, the shipper (generator) must recognize further the general standards and requirements applicable to all packagings and containers used to ship hazardous materials/wastes. These requirements are as follows: (1) no "significant" release of a hazardous material/ waste can occur into the environment, (2) the effectiveness of a packaging or container cannot deteriorate, and (3) no mixture of gases can occur which through a credible spontaneous increase of heat or pressure or through an explosion might reduce the effectiveness of the packaging (49 CFR 173.24 a,b,c). In addition, all packagings which are used to transport hazardous materials/wastes must conform to the design and construction criteria specified in section 173.24.

The reuse of containers for hazardous wastes is of particular interest to hazardous waste generators. If DOT regulations do not limit a packaging or container to non-reusable (NRC) or singletrip (STC), its reuse is authorized, but subject to the special requirements of §173.28 as well. Although this section of the HMTR allows for the reuse of containers, the general responsibility for assuring the safety of the container is placed on the shipper (generator) by sections 173.22, 173.24, 173.28. Therefore, any shipper (generator) who plans to reuse a container or packaging for the transportation of a hazardous material/waste must make certain that the packaging "complies in all respects with the prescribed requirements" for the original container (§173.28). Thorough visual inspections and non-destructive testing may be necessary to comply with these requirements. Part 173 specifies when inspections and re-tests must be done.

In addition to the foregoing conditions that apply to the reuse of containers, there are certain instances when a NRC or STC may be reused to transport a hazardous waste. Section 173.28(p) authorizes the reuse of NRC or STC for the shipment of hazardous wastes to designated facilities provided that the following conditions are satisfied:

- (1) The waste must be packaged in accordance with the requirements of Parts 173, 178 and 179 and offered for transportation in accordance with the general manifest, marking, labeling and placarding requirements of the HMTR.

- (2) Transportation is performed by highway only.
- (3) A package is not offered for transportation less than 24 hours after it is finally closed for transportation, and each package is inspected for leakage immediately prior to being offered for transportation.
- (4) Each package is loaded by the shipper and unloaded by the consignee, unless the motor carrier is a private or contract carrier.
- (5) The packaging can be used only once and can not be used again for shipment of hazardous materials except in accordance with section 173.28(m) and (n) which authorizes the reuse of containers for certain materials, provided that the containers are cleaned, repaired and reconditioned as specified therein.

Included within this section are additional regulations applicable to other types of containers which may be used to transport hazardous materials/wastes. Table E-2 lists the regulation sections which apply to these packagings.

Table E-2 Regulations & Specification for Packaging & Shipments

<u>TITLE</u>	<u>SUBJECT</u>	<u>SECTION</u>
Previously authorized packaging	Regulation specific to certain packagings previously authorized	173.23
Authorized packages in outside containers	General specifications for DOT outside containers	173.25
Quantity limitations & metric measurements	Use of English & metric unit measures	173.26
Aircraft quantity Limitations	Explanation of maximum quantity limits	173.27
Empty Packagings, portable tanks, cargo tanks and tank cars	Regulations pertaining to empty packagings, portable tanks, cargo tanks and tank cars	173.29

Table E-2 continued

Qualification, maintenance and use of tank cars	Regulations pertaining to qualification, maintenance and use of tank cars	173.31
Qualification, maintenance and use of portable tanks	Regulations pertaining to qualification, maintenance and use of portable tanks	173.32
Qualification, maintenance and use of cargo tanks	Regulations pertaining to qualification, maintenance and use of cargo tanks	173.33
Qualification, maintenance and use of cylinders	Regulations pertaining to qualification, maintenance and use of cylinders	173.34

Subparts C through O of Part 173 provide the specific packaging and shipping requirements for each of the 16 DOT classes of hazardous materials/wastes and for the individual materials within each class. Prior to each subpart's instructions on shipping and packaging is a definition of the characteristics of each hazard class. In determining which packaging is appropriate for a particular material/waste, the shipper should consult the Hazardous Material Table for the specific regulation section listed in column 5. Column 5 references the section within these subparts. (See beginning of this section on Packaging for an example of how to use the Table in conjunction with these Subparts). Table E-3 delineates the classes of hazardous materials/wastes for shipping and packaging, and lists the sections in which they are regulated.

Table E-3

Classes of Hazardous Material Regulations for Shipping and Packaging

<u>Class</u>	<u>Subpart</u>	<u>Section</u>
Explosives	C	173.50 - 173.114
Flammable, Combustible, and Pyrophoric Liquids	D	173.115 - 173.149a

Table E-3 continued

Flammable Solids, Oxidizers, Organic Peroxides	E	173.150 - 173.239a
Corrosive Materials	F	173.240 - 173.299a
Compressed Gases	G	173.300 - 173.316
Poisonous Materials, Etiologic Agents and Radioactive Materials	H	173.325 - 173.399
Special Requirements	I	173.400 - 173.432
ORM A, B, C, D, and E	J,K,L,M,N,O	173.500 - 173.1300

Specifications for Containers. The requirements and specifications for hazardous materials and waste shipping containers are also regulated under the provisions of Title 49, Parts 178 and 179. These parts of the regulations delineate the manufacturing and testing specifications for packaging and containers used for the transport of hazardous materials/wastes in commerce.

Part 178 - Shipping Container Specifications. Part 178 delineates the specifications for the classes of shipping containers. It defines each of the classes of containers and states the specifications as to the design, the dimensions, and the capacity of hazardous materials/waste containers. It also sets the standards for materials which may be used to manufacture or construct the containers, the testing requirements for the containers, the packaging, padding and cushioning requirements, and the use and reuse criteria for containers. The classes of shipping specifications are shown in Table E-4 (next page).

Table E-4

Part 178: Classes of Shipping Containers

<u>Class</u>	<u>Section</u>
Carboys, Jugs in Tubs, and Rubber Drums	178.1 - 178.19
Inside Containers, and Linings	178.20 - 178.35a
Cylinders	178.36 - 178.68
Metal Barrels, Drums, Kegs, Cases, Trunks, and Boxes	178.80 - 178.150
Wooden Barrels, Kegs, Boxes, Kits, and Drums	178.156 - 178.198
Fiberboard Boxes, Drums and Mailing Tubes	178.205 - 178.241
Portable Tanks	178.245 - 178.255
Containers for Motor Vehicle transport including tanks and tank cars	178.315 - 178.343
General Packaging	178.350 - 178.350-3

Part 179 - Specifications for Tank Cars. Part 179 delineates the specifications for tanks which are part of or are mounted on a rail tank car used to transport hazardous materials. It defines four different classes of tank cars, and sets the specifications for design, dimensions, and capacity of the tank car. It also regulates the materials which may be used to manufacture or construct the tank car, the testing requirements for the tank car, and the standards for use and reuse of the tank car. The four classes of tank car specifications, as well as general design requirements are shown in Table E-5 (next page).

Table E-5**Part 179: Classes of Tank Cars**

<u>Class</u>	<u>Section</u>
General Design Requirements	179.10 - 179.14
Pressure Tank Car Tanks	179.100- 179.105
Non-Pressure Tank Car Tanks	179.200- 179.221
Multi-Unit Tank Car Tanks	179.300- 179.302
Liquified Hydrogen Tank Car Tanks & Seamless Steel Tanks	179.400- 179.500

F. Transportation

Introduction

According to the HMTR, any hazardous material/waste to be transported to a designated off-site facility must be done so in a manner that best provides protection to environment and human health. The following section discusses the DOT requirements for transporting hazardous material/wastes by the various modes, namely: rail, aircraft, vessel, and highway.

F. Transportation

1. By Rail (Part 174)

With regard to the transportation of hazardous materials/wastes by rail, the HMTR require that shipments be prepared in accordance with Parts 171, 172, and 173 of Title 49 CFR before acceptance by any carrier. Once accepted, each package must be forwarded to its destination, unless it is found to be leaking or in an unsafe condition. Before accepting a shipment of hazardous materials/wastes for transport, each carrier must also:

- (1) Obtain the proper shipping paper/manifest from the shipper (generator) (section 174.24)
- (2) Inspect the shipment to make sure it conforms with the shipping paper/manifest. In addition, packaging and storage conditions should be checked and the inspection must be open, as well, to authorized representatives of the department and the Bureau of Explosives (section 174.8)

Carriers transporting by rail are also required to forward shipments to destinations specified as quickly as possible. The time constraints for movements of hazardous materials/wastes are given in 49 CFR section 174.14.

Subpart C of these regulations deals with the handling, loading, and unloading of hazardous materials/wastes when transporting by rail. The regulations under this subpart require the following:

- (1) Proper bracing and blocking of the materials aboard the transporting car;
- (2) Cleaning of cars that have had hazardous material/waste leaks;
- (3) Proper placarding of the materials; and
- (4) Proper segregation of the materials/wastes when applicable. Hazardous materials/wastes may not be transported together except as provided in Table F-2 (see pages II F-5- and -6-).

Special regulations are also required for piggy back trailer-on-flat-car (TOFC) operations (49 CFR section 174.61) and for portable tank operations (49 CFR section 174.63). Section 174.61 identifies the special provisions for loading and bracing TOFC's and certain restrictions regarding the transportation of hazardous materials/wastes in TOFC's. Section 174.63 specifies the provisions for loading and the conditions requiring

bracing and tie-down for portable tank operations. In addition, other specified procedures for loading tank cars are listed in 49 CFR section 174.67. Table F-1 contains a summary of the special regulations that apply to rail shipments of certain hazardous materials/wastes.

Table F-1 Summary of Special Handling Requirements For Rail Transportation of Hazardous Materials By Hazard Class.

Hazard Class	49 CFR Section	Summary of Regulations
Explosives	Subpart E	Regulations concerning forbidden explosives, loading and inspection, certification and routing of Class A, B, and C explosives.
Gases	Subpart F	Rules for special handling of compressed gas cylinders, tank cars and poison gases.
Flammable Liquids	Subpart G	Regulations concerning special handling of cylinders, drums and trailers containing flam-
Flammable Solids	Subpart H	Regulations for special handling of matches, fire damaged cotton, charcoal, and poisonous flammable solids.
Oxidizers	Subpart I	Rules for handling nitrates, permanganates and poisonous oxidizers.
Poisonous Materials	Subpart J	Regulations for handling Poison A materials, cleaning contaminated cars and prohibition of transporting poisons with food stuffs.
Radioactive Materials	Subpart K	Requirements for special handling and cleanliness for low specific activity radioactive yellow II c. 7II and fissile class III materials.
Corrosive Materials	Subpart L	Special handling requirements for corrosive materials, storage batteries and nitric acid.

Except as provided in section 172.205, the proper shipping paper/manifest must accompany any shipment of hazardous material/waste offered for transportation by rail, and the papers must be in the possession of one of the crew members aboard the transporting train. A certificate may be required on the shipping paper/manifest as indicated in section 172.204. These requirements do not apply to materials/wastes offered for transportation which are classed as ORM - A,B,C or D.

In addition, each train crew that transports a hazardous material/waste must have documents indicating the location of each placarded hazardous material/waste on the train. A train manifest may be used to meet this requirement and the DOT requires that this document be transferred from crew to crew at all points of train and engine crew exchange.

Special billing information is given in section 174.25. Each waybill, switching ticket, or switching order must contain the same descriptive information as required on the shipping paper/manifest of a hazardous material/waste shipment. The carrier must also mark the shipment as prescribed in section 174.25(a). Listed under this section is the information required on the switching document when switching operations occur. Specifically, any waybill, switching ticket, or switching order must contain:

- (1) The proper DOT shipping name and hazard class specified for the material/waste in section 172.101;
- (2) The total quantity of hazardous material/waste;
- (3) The shippers certification and signature specified in section 172.204, except when a certified bill of lading is offered to the carrier(transporter);
- (4) the placarded notation specified in either Table 1 or 2, as appropriate, in section 174.25(a);
- (5) the letters "RQ" before or after the basic description for any entry that is a hazardous substance.

In addition, waybills, switching tickets, and switching orders must contain information identifying specifically which containers hold hazardous materials/wastes along with a "placard endorsement" on the waybill to draw attention to the dangerous nature of that shipment. For empty, uncleaned tank cars previously containing hazardous materials/wastes, the waybills must include the precautionary wording which is specified in section 174.25 (example: "EMPTY: Sulfuric acid, Corrosive material, UN 1830, Placarded:" or "EMPTY: Last Contained Sulfuric acid, Corrosive material, UN 1830, Placarded".

Table F-2 Hazardous Materials That Should Not Be Transported Together

Hazardous Material (see footnote)	Code	Hazardous Material (See Code Explanation at Left)																						
		a	b	c	d	e	f	g	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Low Explosives or Black Powder	a				X					X							X	X	X	X	X	X	X	X
High or Propellant Explosives, Class A	b				X	X		X		X							X	X	X	X	X	X	X	X
Initiating or Primary Explosives	c			X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Blasting Caps	d			X	X		X	X		X							X	X	X	X	X	X	X	X
Ammunition for Explosive Projectiles	e				X	X		X		X							X	X	X	X	X	X	X	X
Explosive Projectiles	f				X	X		X		X							X	X	X	X	X	X	X	X
Detonating Fuzes, Class A	g			X	X		X	X		X							X	X	X	X	X	X	X	X
Ammunition for Cannon and Rocket with Projectiles	1				X															X			X	
Propellant Explosives, Class B	2				X															X			X	
Fireworks, special or railway torpedoes	3			X	X	X	X	X	X	X														X
Small Arms Ammunition, or cartridges	4				X																			
Primers	5				X																			
Percussion Fuzes, or Tracers	6				X																			
Time, Combination, or Detonating Fuzes, Class C	7				X																			
Cordean Detonant Fuse, Safety squibs, Fuse lighters, Fuse igniters, Delay electric igniters, Electric squibs, Instantaneous fuse or igniter cord	8				X																			

Table F-2. continued

Hazardous Material (see footnote)	Code	Hazardous Material (See Code Explanation at left)																							
		a	b	c	d	e	f	g	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Fireworks	9	X	X	X	X	X	X	X																X	
Flammable Liquids or Gases	10	X	X	X	X	X	X	X																X	
Flammable Solids or Oxidizers	11	X	X	X	X	X	X	X												X				X	
Corrosive Materials	12	X	X	X	X	X	X	X	X	X									X					X	
Nonflammable Gases	13	X	X	X	X	X	X	X																	
Poisonous Gases or Liquids	14	X	X	X	X	X	X	X	X	X	X						X	X	X	X					
Radioactive Materials	15	X	X	X	X	X	X	X																	
Blasting Agent	16				X						X														

Letter X at intersection of horizontal and vertical columns shows combinations that must not be loaded, stored or transported together. For example, Corrosive Materials (12) should not be loaded with Flammable Solids or Oxidizers (11).

Note: For exceptions and/or special provisions to these requirements, see Section 174.81 of the HMIR.

Section 174.25 also requires that whenever Explosive A shipments are transported by rail, the carrier must:

- (1) Make a record of the car, originating point, carrier's name and date of the car certificate; and
- (2) Inspect the blocking and bracing, and certify compliance with the requirements of this part.

In the event of a hazardous material/waste incident, incident reports are required under certain conditions. Section 171.15 requires each carrier to make a telephoned report to DOT -- (800) 424-8802 when a hazardous material/waste incident occurs. Incidents involving an etiologic agent must be reported by phone, instead, to the Center for Disease Control, U.S. Public Health Service, Atlanta, GA. -- (404) 633-5313. A telephoned report must be made after each incident in which:

- (1) A person is killed;
- (2) A person receives injuries requiring his hospitalization;
- (3) Estimated carrier or property damage exceeds \$50,000;
- (4) Fire, breakage, spillage, or suspected contamination occurs involving shipment of radioactive material;
- (5) Fire, breakage, spillage, or suspected contamination occurs involving shipment of etiologic agents; or
- (6) A situation exists of such a nature that, in the judgment of the carrier, it should be reported in accordance with this section even though it does not meet the criteria of (1), (2), or (3) above; e.g., a continuing danger to life exists at the scene of the incident.

Each telephoned report must include the following:

- (1) Name of reporter;
- (2) Name and address of carrier(transporter) represented by reporter;

- (3) Phone number where reporter can be contacted;
- (4) Date, time and location of incident;
- (5) The extent of injuries;
- (6) Classification, name, and quantity of hazardous materials/wastes involved, if such information is available; and
- (7) Type of incident and nature of hazardous material/waste involvement and whether a continuing danger exists at the scene.

In addition, Section 171.16 requires each carrier making a report under section 171.15 to submit the same report in writing on the DOT Form F 5800.1 to the Chief, Information Systems Division, Transportation Programs Bureau, Department of Transportation, Washington, D.C. 20590. This report must be filed within 15 days of the date of the incident.

Section 171.17 applies to hazardous substance discharges and requires in the event of a discharge, that the person in charge of the vehicle make:

(1) a telephoned report to the U.S. Coast Guard National Response Center at (800)424-8802 or (202)426-2675 supplying : (1) the information required by §171.15, (2) the name of the shipper of the substance, and (3) the quantity of substance discharged, if known. The carrier shall

make this notification if the person in charge is incapacitated or otherwise unable to notify. In addition, Part H of the required report under §171.16 must include: (1) an estimate of the quantity of substance unremoved from the scene and (2) the manner of disposition of any removed substance.

Leaking packages of hazardous materials/wastes, other than tank cars, may not be forwarded for transportation until the packages are repaired or reconditioned. However, leaking or defective packages may be overpacked in DOT specification drums that are:

- (1) Compatible with the leaking material/waste;
- (2) Provided with adequate closures; and
- (3) When appropriate, provided with sufficient cushioning and absorption materials.

A non-DOT specification drum may be used provided that it does not exceed a 110-gallon capacity and provides equal or better protection to the environment than the drums normally required by DOT. The carrier has the option to forward the shipment to its destination or return it to the shipper for disposal or repacking.

Actions which should be taken when leaking tank cars are discovered are stated in section 174.50. In general, the section requires that:

- (1) leaking tank cars should not be unnecessarily moved until corrected; and
- (2) leaking tank cars must be protected against ignition.

In addition, this section addresses special marking, removal and moving requirements. Tank cars with small leaks may continue in transit if actions are taken to prevent the leak from spreading. For other pertinent regulations on spill incidents and leaking containers during transport by rail, see Table F-3.

Table F-3 Pertinent Rail Spill Incident Regulations

Topic	49 CFR Section	Subject
Disposition of damaged shipments	174.103	Regulations with regard to handling, repackaging, disposition, and inspection of damaged materials.
Poison A shipped by, for, or to the Department of Defense	174.290	Leaking container requirements for the shipment of Poison A.
Incidents involving leakage of radioactive material	174.750	Regulations with regard to 171.15 and 171.16, notification of the shipper, use, and service restrictions, segregation of materials, and assistance procedures.

With regard to the regulations concerning transporters of hazardous wastes, EPA has adopted certain DOT regulations governing the rail and bulk water transportation of hazardous materials. These regulations were adopted to ensure consistency

with the DOT requirements of 49 CFR Parts 171 through 179. This avoids the establishment of duplicative and conflicting requirements between the agencies with respect to hazardous waste transportation.

In 40 CFR 263, the EPA established requirements for transportation of hazardous waste by rail. These requirements were adopted, in recognition of rail transporters' computerized tracking and information systems, to make the practical operation of the manifest system possible without substantially reducing protection to human health and the environment. The EPA does not require rail transporters to send the manifest directly with a waste shipment. The manifest requirements for shipments involving rail transportation are listed in §263.20(f).

Table 1-1: Requirements for Hazardous Waste Shipments by Rail

Topic	40 CFR Section	Subject
Disposition of damaged shipments	171.103	Regulations with respect to handling, packaging, and disposition of damaged shipments
Person A shipped by rail, or to the Department of Defense	171.103	Regulations with respect to labeling requirements for the shipment of Person A
Incidents involving loss of toxic or reactive material	171.103	Regulations with respect to 171.103 and 171.104, notification of the shipper, and service of notice to the Department of Defense, notification of railroad, and assistance procedures

With regard to the regulations concerning transportation of hazardous waste, EPA has adopted certain DOT regulations governing the rail and water transportation of hazardous materials. These regulations were adopted to ensure consistency

2. By Aircraft (Part 175)

This part of the HMTR pertains to hazardous materials/wastes transported by aircraft. Section 175.30 specifies the general conditions for which a hazardous material/waste may be accepted for transportation by this mode. It states that no person may accept a hazardous material/waste for transportation by aircraft, unless the hazardous material/waste is:

- (1) Either authorized or within the quantity limitation specified for aircrafts according to column (6) of the Hazardous Materials Table in 172.101;
- (2) Described and certified on a shipping paper or manifest, as appropriate;
- (3) Labeled and marked, or placarded (when required) in accordance with the requirements of section 172.300 - 172.558; and
- (4) Labeled with the "CARGO AIRCRAFT ONLY" label, if the material/waste is not permitted aboard passenger-carrying aircrafts as specified in column (6) of the Hazardous Materials Table of 172.101.

In addition, each operator of an aircraft must inspect all packages and outside containers carrying a hazardous material/waste to verify that they are packaged in accordance with the packaging requirements prescribed for that material/waste in section 173 of the HMTR. A package or container may not be accepted by a carrier if it has holes, is leaking or otherwise damaged. In the event that a package has been damaged or is leaking, section 175.90 requires that it must be removed from the aircraft. The general requirements of section 175.30, however, allow materials/wastes classed as ORM-D which are packed in freight containers and offered for transport by one consignor to be excluded from the foregoing requirements.

Section 175.45 requires an aircraft operator to report to the Federal Aviation Administration (FAA), Civil Aviation Security Office when a hazardous materials/waste incident occurs. The operator must notify by telephone one of the foregoing officers at the earliest practicable moment following an incident in which any hazardous material/waste causes or may cause injury to human health or property damage. Incidents involving the shipment of etiologic agents require an alternative report which should be

telephoned directly to the Director, Center for Disease Control, U.S. Public Health Service, Atlanta, Georgia, (404) 633-5313.

The aircraft operator is also required to submit in duplicate, a report on DOT Form 5800.1 within 15 days of the date of discovery of each incident. The report should be sent to the Chief, Information Systems Division, Transportation Programs Bureau, Department of Transportation, Washington, D.C., 20590, with a separate copy to the FAA facility indicated above (49 CFR 175.45(a)).

Section 175.75 governs the quantity of a hazardous material/waste that is permitted to be carried aboard an aircraft. Not more than 50 lbs. (net weight) of hazardous material/waste and 150 lbs. of non-flammable compressed gas may be carried aboard a passenger-carrying aircraft, freight container within an accessible cargo compartment, or accessible cargo compartment in a cargo-only aircraft. There is no limit to the number of packages of ORM materials/wastes permitted aboard an aircraft for transport. Excepted from these regulations are hazardous materials/wastes that are permitted in Part 172 of the HMTR. Table F-4 gives a summary of some other regulations addressed under this part of the HMTR.

Table F-4 Regulations governing Transportation by Aircraft

Topic	49 CFR Section	Summary
Purpose and Scope	175.1	Requirements for aircraft operators
Exceptions	175.10	Items not subject to these regulations
Compliance	175.20	Responsibility of operator to comply with the HMTR
Shipping papers	175.35	Required documents for transporting
Labels	175.40	Keeping and replacing of labels
Compatibility of cargo	175.78	Requirements for stowage compatibility
Orientation of cargo	175.79	Cargo orientation requirements for loading and storage

Table F-4 continued.

Topic	49 CFR Section	Summary
Cargo location	175.85	Requirements for location of cargo in aircraft
Self-propelled vehicles	175.305	Requirements for drainage, fuel tank, and ventilation
Small passenger-carrying aircraft	175.310	Requirements for transportation of flammable liquid fuel
Cargo-only aircraft	175.320	Conditions requiring transportation as such
Poisons	175.630	Special requirements for transporting
ORM	175.640	Special requirements for transporting Asbestos
Radioactive materials	175.700	Regulations regarding stowage, incidents, quantity and prohibition conditions.

3. By Vessel (Part 176)

Transportation of hazardous materials/wastes by vessel is governed by Titles 46 and 49 of the CFR. A vessel must meet the federal requirements for design and condition, and operate in accordance with 49 CFR 176 before it can transport a shipment of hazardous material/waste. Included under this section of the HMTR are those regulations governing:

- (1) Operating requirements;
- (2) Handling and stowage requirements (including segregation);
- (3) Detailed requirements for specific hazardous materials/wastes; and
- (4) Requirements for spill response.

There are four pertinent operating requirements for carriage of hazardous materials/wastes by vessel:

- (1) Shipping paper/manifest;
- (2) Certification;
- (3) Inspection; and
- (4) Segregation.

Shipments of hazardous materials/wastes being transported by vessel must be accompanied by the proper shipping paper/manifest. The proper DOT shipping name, the hazard classification, and the total quantity of the material/waste being shipped must appear on the paper, in addition to the information required in 49 CFR 172.202 and 172.203 (see section D of this manual). A certificate prepared in accordance with 172.204 must also accompany a hazardous material/waste shipment transported by vessel. This certificate verifies that the hazardous material/waste has been properly prepared for transport according to DOT regulations.

Section 176.83 lists the specific stowage and separation constraints for hazardous materials/wastes accepted for transport aboard a vessel. Table F-5 specifies the categories of explosives not permitted to be stowed together and Table F-6 lists the minimum separation requirements that apply with the exception of ferry vessels. After proper stowage, periodic inspections must be conducted to ensure that the cargo is in safe condition and that there is no damage to any of the packages.

Table F-5 Restrictions on Stowage of Hazardous Materials

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Class A Explosives																
1 Low explosives or black powder			X							X						X
2 High explosives, Class A			X	X			X			X						X
3 Initiating or primary explosives	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X
4 Blasting caps		X	X		X	X				X						X
5 Ammunition for explosive projectiles			X	X			X			X						X
6 Explosive projectiles			X	X			X			X						X
7 Detonating fuzes,		X	X		X	X				X						X
Class A																
Class B Explosives																
8 Ammunition for cannon or rocket with empty, inert-loaded or solid projectiles, or without projectiles			X													
9 Propellant Explosives,			X													
Class B																
10 Fireworks, special or railway torpedoes	X	X	X	X	X	X	X	X	X							
Class C Explosives																
11 Small Arms ammunition			X													
12 Primers			X													
13 Percussion fuzes, or tracers			X													

Table F-5. continued

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
14 Time, combination, or detonating fuzes, Class C			X													
15 Corded detonant fuse, safety squibs, fuse lighters, fuse igniters, delay electric igniters, electric squibs, instan- taneous fuse or igniter cord			X													
16 Fireworks, highway or railway fuses	X	X	X	X	X	X	X									
17 Blasting agent, no	X									X						
18 Ammonium nitrate- fuel oil mixtures	X									X						

Table F-6 Separation Requirements for Stowage of Hazardous Materials

	1(A)	1(B)	1(C)	2(A)	2(B)	3	4(A)	4(B)	4(C)	5(A)	5(B)	6(A)	6(B)	7	8	9
EXPLOSIVES A.....	1(A)	•	•	•	4	2	4	4	4	4	4	4	2	2	2	4
EXPLOSIVES B.....	1(B)	•	•	•	4	2	4	3	3	4	4	4	2	2	2	0
EXPLOSIVES C, BLASTING AGENTS.....	1(C)	•	•	•	2	1	2	2	2	2	2	2	1	0	2	0
FLAMMABLE COMPRESSED GASES.....	2(A)	4	4	2	0	0	2	1	2	1	2	4	0	0	2	1
NONFLAMMABLE COMPRESSED GASES.....	2(B)	2	2	1	0	0	2	0	1	0	0	2	0	0	1	0
FLAMMABLE OR COMBUSTIBLE LIQUIDS.....	3	4	4	2	2	2	2	2	2	2	2	3	2	0	2	1
FLAMMABLE SOLIDS.....	4(A)	4	3	2	1	0	2	1	1	1	1	2	0	0	2	1
FLAMMABLE SOLIDS LABELED SPONTANEOUSLY COMBUSTI- BLE.....	4(B)	4	3	2	2	1	2	1	1	2	2	1	0	2	1	0
FLAMMABLE SOLIDS LABELED DANGEROUS WHEN WET.....	4(C)	4	4	2	1	0	2	1	1	2	2	0	0	2	1	0
OXIDIZERS.....	5(A)	4	4	2	2	0	2	1	2	2	2	2	0	1	1	0
ORGANIC PEROXIDES.....	5(B)	4	4	2	4	2	3	2	2	2	2	2	1	2	2	0
CLASS A POISONS.....	6(A)	2	2	1	0	0	2	0	1	0	0	2	0	1	0	0
CLASS B POISONS OR IRRITATING MATERIALS.....	6(B)	2	2	0	0	0	0	0	0	1	1	0	0	0	0	0
RADIOACTIVE MATERIALS.....	7	2	2	2	2	1	2	2	2	2	1	2	1	0	2	0
CORROSIVE MATERIALS.....	8	4	2	2	1	0	1	1	1	1	2	2	0	0	2	0
OTHER REGULATED (ORM) MATERIALS.....	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

The symbols used in Table F-6 mean the following:

- (1) "1" - Away from -- means effectively segregated so that materials may not interact dangerously in the event of an accident.
 - (2) "2" - Separated from -- means in separate holds when stowed "under deck". For "on deck" stowage, "away from" segregation is authorized.
 - (3) "3" - Separated by a complete cargo compartment or hold from.
 - (4) "4" - Separated longitudinally by an intervening complete cargo compartment or hold from.
 - (5) "0" - No general segregation specified; individual entries in the Hazardous Material Table in 172.101 of the HMTR should be consulted.
 - (6) "*" - Consult Table F-5 of this section for segregation requirements between different explosives.
-

The general handling and stowage regulations for vessels concern materials/wastes shipped in either bulk or containers, and also those materials/wastes being transported within another vehicle aboard the vessel. There are further requirements for the preparation of the vessel prior to the loading of hazardous materials/wastes, for supervision during the loading and stowage of the shipment, for stowage and for the use of power-operated industrial equipment on board the vessel when loading or unloading. In addition, the regulations have detailed requirements specifically for the shipment of certain hazardous materials/wastes. These regulations pertain to the general procedures for operation, handling and stowage, and obtainment and use of permits to transport hazardous materials/wastes. The various sections addressed under this part are listed in Table F-7 (next page). It should be noted that the general handling and stowage requirements, and the operating requirements work in conjunction with each other and thus, must be observed accordingly.

Table F-7 Summary of Special Regulations for Transporting Hazardous Materials/Wastes by Vessel

Topic	49 CFR Part 176	Summary of Contents
Ferry vessels carrying vehicles loaded with hazardous materials	Subpart E	Regulations pertaining to control, handling and special equipment
Barges	Subpart F	Detailed requirements for stowage, special permits and construction
Explosives	Subpart G	Detailed requirements
Compressed Gases	Subpart H	Detailed stowage requirements; warning signs
Flammable and Combustible Liquids	Subpart I	Detailed requirements for stowage, fire protection, use of flashlights, transportation and
Flammable solids, oxidizers, organic peroxides and blasting	Subpart J	Detailed requirements for stowage, special permits and transportation and warning signs
Poisons and Irritating materials	Subpart L	Detailed requirements for stowage; care for certain leaking or sifting items
Radioactive materials	Subpart M	Detailed requirements for stowage, leaking or sifting, and contamination control
Corrosive materials	Subpart N	Detailed stowage requirements
ORM	Subpart O	Detailed stowage requirements for certain materials; special requirements for mechanical equipment

According to Title 49, the regulations governing emergency situations require the master of the transporting vessel to provide for its safe operation. In the event of an accident resulting in damaged packages or emergency use of unauthorized packages, the operator of the vessel must notify the nearest Captain of the Port, U.S. Coast Guard for further instruction. If hazardous materials/wastes are jettisoned or lost, the master of the vessel must then notify the nearest Captain of the Port and the Commandant (GMHM), as soon as possible regarding:

- (1) The location of the material/waste;
- (2) The quantity; and
- (3) The type of material/waste.

The U.S. Coast Guard is currently amending their Title 46 regulations to include regulations for transportation of hazardous wastes in bulk. Once these regulations are approved, transporters carrying hazardous wastes will be required to adhere to these requirements.

EPA regulations under Title 40 Part 263 also govern bulk water shipments. These regulations state that the manifest need not accompany a hazardous waste shipment. The shipper (generator) may send the manifest directly to the treatment, storage, or disposal facility, if:

- (1) The material is delivered by water (bulk shipment) to the designated facility; and
- (2) The shipping paper accompanying the shipment contains all the information required on the manifest, except EPA ID number, generator certification and signature; and
- (3) The delivering transporter has the owner or operator of the designated facility to sign and date the delivery of the shipment on the manifest or shipping paper; and
- (4) The person delivering the shipment to the initial transporter obtains the date of delivery and signature of the water(bulk shipment) transporter on the manifest and forwards it to the designated facility; and
- (5) Each vessel transporter retains a copy of the shipping paper or manifest for 3 years from the date the shipment was accepted by the initial transporter.

4. By Highway (Part 177)

The trucking industry is governed by various parts of DOT. The Motor Carrier Safety Regulations (MCSR-49 CFR Part 397) and the Hazardous Materials Transportation Regulations (HMTR-49 CFR Part 177) are the principle safety regulations that apply to the transportation of hazardous materials/wastes via highway. The Motor Carrier Safety Regulations govern those aspects of transportation concerning in transit operation. Included under Subpart A of Part 173 are requirements for:

- (1) Compliance with Federal Motor Carrier Safety Regulations (FMCSR);
- (2) State and local laws, ordinances, and regulations;
- (3) Attendance and surveillance of motor vehicles;
- (4) Parking;
- (5) Routes;
- (6) Fires;
- (7) Smoking;
- (8) Fueling;
- (9) Tires;
- (10) Instructions and documents; and
- (11) Marking of vehicles operated by private carriers.

According to the HMTR under 49 CFR Part 177, motor carriers may accept for transportation only those shipments prepared in accordance with the marking, labeling and placarding requirements under 49 CFR Part 172. Shipments to continue onto another mode must meet the applicable regulation standards for the mode(s) by which they are to be transported. For example, a shipment initially being transported by highway that will continue via vessel must meet the appropriate marking, labeling and packaging provisions before it is accepted for transportation by vessel. Shipments of hazardous materials (except hazardous waste) offered by the Department of Defense (DOD) are excluded from these regulations provided that:

- (1) The hazardous materials are packaged, including limitations of weight, in accordance with the regulations of this section; or

- (2) in containers that provide equal or greater strength and efficiency as required by DOD regulations.

Radioactive materials shipped by or under the U.S. Department of Energy (DOE) or DOD, for the purposes of national security, are exempt from the requirements under 49 CFR 170-189. However, these shipments must be accompanied by personnel specifically designated or under authority of those agencies. Packages properly shipped and marked as "Limited Quantity" when authorized under column 5(a) of the Hazardous Materials Table, are excepted from required labeling and general packaging specifications under 5(b) of the Hazardous Materials Table.

The regulations under this part of the HMTR also require that:

- (1) The proper shipping paper/manifest be readily available and recognizable in case of an accident (49 CFR 177.817);
- (2) Retesting and inspection of cargo tanks be carried out by a responsible and experienced inspector (49 CFR 177.824); and
- (3) A certificate of manufacture or retest of cargo tank vehicles be on file at the principle company (49 CFR 177.814).

For-hire passenger carrying motor vehicles are not generally permitted to carry materials labeled as hazardous according to Part 172. Exceptions to this rule are:

- (1) Emergency shipments of hazardous materials/wastes such as small-arms ammunition, drugs, chemicals, hospital supplies, and war munitions accompanied by the armed service; and
- (2) Limited quantities of hazardous materials/wastes weighting not more than 100 lbs. (gross weight) for a given hazardous class, or 500 lbs aggregate.

In addition, no explosive shipment weighting more than 100 lbs. (gross weight) permitted to be transported by rail may be transported aboard a passenger-carrying vehicle except under the condition stated in 49 CFR 177.870(d). Under this section, motor carriers are not authorized to carry liquid or paranitraniline Class A,B, or C poisons aboard a passenger-carrying vehicle. A non-liquid Class B poison may be carried

aboard, however, provided that the aggregate gross weight of the shipment does not exceed 100 lbs. (49 CFR 177.870)

Subpart B of Part 177 specifies several general requirements for the loading and unloading of hazardous materials/wastes:

- (1) Any tank, barrel, drum, cylinder or other loose package must be secured against movement within the vehicle;
- (2) Smoking is not permitted while loading or unloading flammable, explosive or oxidizing materials;
- (3) A pole trailer may not be used to transport hazardous materials;
- (4) The handbrake must be set;
- (5) Do not use any handling tool that will damage the package;
- (6) Containers must be loaded in such a way that there is no motion between them;
- (7) Care must be taken to prevent "undue rise in temperature of containers" while in transit;
- (8) Attendance by a qualified person is mandatory while loading and unloading a cargo tank with hazardous material. A qualified person is one who is aware of the nature of the hazardous material, has been instructed in emergency procedures and is authorized and capable of moving the cargo tank;
- (9) Flammable solids, oxidizing materials or corrosive liquids must be loaded so that they can be readily removed; and
- (10) When transporting flammable materials, only DOT authorized cargo heaters may be used and the restrictions on such devices must be observed.

In addition, the specific regulations for several of the hazard classes are found in Table F-8(next page).

Table F-8 Hazard Class Loading and Unloading Requirements

Hazard Class	49 CFR Section	Summary
Forbidden (or limited for transportation)	177.821	Items not acceptable for transportation, damaged packages
Explosive A, B, C	177.835	Stop engine; use special care and handling
Non-Explosives	177.836	Containment restriction
Flammable Liquid	177.837	Ground containers when transferring liquids; stop engine; close all manholes and valves
Flammable Solids & Oxidizer	177.838	Ship completely enclosed in vehicle body; provide adequate ventilation; block and brace packages containing matches
Corrosive Liquid	177.839	Do not stack in trailers; protect batteries from falling or shorting
Compressed Gases	177.840	Cylinders must be shipped and stored on flat surface, lashed properly; tank-trucks - stop engine while loading and unloading; gas mask must be available in tank trucks carrying chlorine
Poison A	177.841	No Class A poisons can be shipped in bulk in cargo tanks
Radioactive Material -see Table 173.389(j)	177.842	Trucks must be surveyed for radioactivity after use. No loads to exceed Index 50
ORM	177.844	Loading and transport requirements for Asbestos

Some hazardous materials/wastes may not be loaded, transported, or stored together aboard motor vehicle. Table F-9 (next page) is a summary of the restrictions that appear in section 177.848. This section should not be so construed as to forbid the carrying of materials essential to the safe operation of the vehicle (see MCSR:Part 393 of Title 49). For instance, batteries tires, or heaters are not subject to the requirements under section 177.848 provided that the material is not inconsistent with or prohibited by Parts 390-397 of the HMTR.

Leaking container and spill incidents involving the shipment of hazardous materials/wastes by highway are regulated under the provisions of 49 CFR, Section 177.807, which requires the transporter to comply with the Incident Reporting requirements of sections 171.15, 171.16 & 171.17. The procedures for handling broken or leaking packages, and disabled vehicles are specified in Section 177.854. This section of the regulations addresses the procedural requirements pertaining to:

- (1) Care of lading hazardous materials/wastes;
- (2) Disposition of broken or leaking containers in transit;
- (3) Repairing and overpacking packages, and their transportation thereof;
- (4) Disposition of unsafe broken packages;
- (5) Stopped vehicles and other dangerous articles;
- (6) Repair and maintenance of vehicles containing certain hazardous materials; and
- (7) Repair (of vehicle) with flame.

Other pertinent regulations on spill incidents and leaking containers during transport by motor vehicle are shown in Table F-10 (see page - II(F) 26 -).

Table F-9 Hazardous Materials That Should Not Be Loaded,
Transported or Stored Together

Hazardous Material (see footnote)	Code	Hazardous Material (See Code Explanation on Left)													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Low Explosives, Black Powder	1			X				X		X	X	X	X	X	X
Explosive, Class A	2			X	X					X	X	X	X	X	X
Initiating or Primary Explosives	3	X	X		X	X	X	X	X	X	X	X	X	X	X
Blasting Caps	4		X	X		X		X		X	X	X	X	X	X
Ammunition	5									X	X	X	X	X	X
Ammunition for Cannon, Propellant Explosive	6			X								X		X	
Fireworks	7	X	X	X	X	X								X	
Small Arms Ammunition, Primers, Fuses	8			X											
Fireworks, Flammable Liquid	9	X	X	X	X	X								X	
Flammable Solid	10	X	X	X	X	X	X					X		X	
Corrosive Liquid	11	X	X	X	X	X	X				X			X	
Non-Flammable Gas	12	X	X	X	X	X									
Poison Gases	13	X	X	X	X	X	X	X		X	X	X			
Radioactive Material	14	X	X	X	X	X									

Note: For exceptions and/or special provisions to these requirements, see Section 177.848 of the HMTR.

Table F-10 Pertinent Hazardous Material Spill Incident Regulations

Topic	49 CFR Section	Subject
Accidents; Explosives	177.855	Regulations with regard to warnings, handlings, repairs, and disposition of spilled or leaking explosives
Accidents; Flammable Liquids	177.856	Regulations on control of spectators, control of spread of leakage, and transfer or further transport of the material.
Accidents; Flammable Solids and Oxidizing Materials	177.857	Regulations with regard to warnings, reloading, and disposition of spilled or leaking materials
Accidents; Corrosive Materials	177.858	Regulations with regard to the handling of damaged lading, and leaking cargo tanks
Accidents; Compressed Gases	177.859	Regulations with regard to warnings, transfer of material, and precautionary measures
Accidents or Leakage; Poisons	177.860	Regulations associated with warnings, leakage, and leaking cargo tanks
Accidents; Radioactive Materials	177.861	Regulations with regard to 171.15 and 171.16, notification of the shipper, use and service restrictions, and cleaning procedures

III. Conclusions

As stated at the opening of this Manual, a considerable portion of the EPA pretransportation requirements and standards for hazardous waste generators reference the DOT Hazardous Materials Transportation Regulations. In order to fully understand these EPA requirements and assure that EPA regulated hazardous wastes are transported properly, it has been necessary to discuss in detail the regulations set forth by DOT for hazardous materials transportation.

In considering the HMTR, it has also been important to remember that DOT views hazardous wastes as a subset of hazardous materials.

Thus, all DOT shipping requirements for hazardous materials are equally applicable to hazardous wastes, unless special requirements are specified by EPA or DOT. Both Agencies, however, have worked together to assure that the two sets of regulations are coordinated sufficiently to avoid overlap or conflict. In summarizing the combined requirements of EPA and DOT for hazardous waste transportation, a generator must:

- (1) Determine that his waste is hazardous either because it is an EPA listed hazardous waste, or because it is ignitable, corrosive, reactive or toxic (40 CFR 261);
- (2) Notify EPA of his hazardous waste activity and receive an EPA identification number (40 CFR 262.12);
- (3) Properly identify and classify the waste in terms of the appropriate DOT nomenclature and hazard classification (49 CFR 172.101, 49 CFR 173);
- (4) Properly package, mark and label the waste (40 CFR 262.32(b), 49 CFR 172.101, 49 CFR 172.300-.330, 49 CFR 172.400-.450, 49 CFR 173);
- (5) Complete a hazardous waste manifest with the appropriate number of copies (40 CFR 262.20-.23);
- (6) Certify that the waste shipment meets all of the pre-transportation requirements under DOT and EPA (40 CFR 262.21(b);
- (7) Provide appropriate placards to the transporter, or affix the placards if movement is by rail (49 CFR 172.500-.558);
- (8) Determine if the shipment is prohibited from certain modes of transportation, or if additional shipping requirements must be satisfied for the mode of transportation used (49 CFR 172.101, 49 CFR 174 - 177);

- (9) Make certain that the transporter and the designated treatment, storage or disposal facility have an EPA identification number (40 CFR 262.12(c)); and
- (10) Comply with EPA recordkeeping and reporting requirements (40 CFR 262.40-.43)

A transporter must:

- (1) Notify EPA that he is a transporter of hazardous wastes and receive an EPA identification number (40 CFR 263.11);
- (2) Verify that the shipment of hazardous waste has been properly identified, packaged, marked and labeled and that no packages are leaking or damaged (Rail: 49 CFR 174.3; Air: 49 CFR 175.3; Vessel: 49 CFR 176.3; Highway: 49 CFR 177.801);
- (3) Sign the manifest (40 CFR 263.20(b));
- (4) Apply the appropriate placards to the vehicle (49 CFR 172.506)
- (5) Carry the manifest in accordance with 40 CFR 263.20, 49 CFR 174.24, 49 CFR 175.35, 49 CFR 176.24, 49 CFR 177.817;
- (6) Obtain a handwritten signature from the next transporter, or the owner/operator of the designated treatment, storage or disposal facility (40 CFR 263.20(d));
- (7) Comply with EPA recordkeeping and reporting requirements (40 CFR 263.22);
- (8) Take appropriate immediate action in the event of a hazardous waste incident and satisfy all DOT incident reporting requirements (40 CFR 263.30, 49 CFR 171.15-.16-.17).

Enforcement of these regulations will also be the dual responsibility of DOT and EPA. Thus, certain important steps have already been initiated by each Agency to help unravel this complex and highly interrelated field. On July 3, 1980 both DOT and EPA finalized a Memorandum of Understanding (MOU) which delineated the enforcement responsibilities of the EPA and DOT Agency regarding the transportation of hazardous wastes. The MOU authorizes EPA to:

- Conduct an on-going program to monitor the compliance of generators of hazardous waste and hazardous waste management facilities with the RCRA regulations.

- Bring enforcement actions involving hazardous waste transporters where the transportation is ancillary to treatment, storage or disposal of hazardous waste or other activities normally under the jurisdiction of the EPA. For example, a "midnight dumper" will be considered an illegal disposer. The fact that the "dumper" is transporting the waste is ancillary to the disposal of the waste and EPA will bring appropriate enforcement action against him.
- Provide DOT with current lists of all hazardous waste transporters who have notified EPA as required in Section 3010 of RCRA.
- Investigate reports from DOT which give EPA cause to suspect that a violation of RCRA has occurred and, where warranted, initiate appropriate regulatory or enforcement action under RCRA.
- Bring enforcement actions to address hazardous waste activities which may present an "imminent and substantial endangerment to health and the environment" as those words are used and administered by EPA (Section 7003 of RCRA and Section 504 of the Clean Water Act.)

The MOU also authorizes the DOT to:

- Conduct an on-going program of inspections of transporters and shippers of hazardous waste to monitor their compliance with HMTR.
- Investigate reports from EPA which give DOT cause to suspect that a violation of HMTA has occurred and, where warranted, initiate appropriate regulatory or enforcement action under HMTA.

In addition to outlining the foregoing responsibilities, the MOU requires each Agency to exchange pertinent information and reports, coordinate investigations and enforcement actions, maintain a close working relationship and assign liaison representatives to offices at the regional and central levels.

APPENDIX I

DOT Definitions

"Carrier" means a person engaged in the transportation of passengers or property by:

- (1) Land or water, as a common, contract, or private carrier, or
- (2) Civil aircraft.

"Hazardous material" means a substance or material which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been so designated.

"Hazardous substance" for transportation purposes, means a material, and its mixtures or solutions, that is identified by the letter "E" in Column 2 of the Hazardous Materials Table to Sec. 172.101 when offered for transportation in one package, or in one transport vehicle if not packaged, and when the quantity of the material therein equals or exceeds the reportable quantity (RQ).

"Hazardous waste" for transportation purposes, means any material that is subject to the hazardous waste manifest requirements of the EPA specified in CFR, Title 40, Part 262 or would be subject to these requirements absent an interim authorization to a state under CFR, Title 40, Part 123, Subpart F.

"Limited Quantity", when specified as such in section applicable to a particular material with the exception of Poison B materials, means the maximum amount of a hazardous material for which there are specific labeling and packaging exception.

"Marking" means applying the descriptive name, instructions, cautions, weight or specification marks or combination thereof required by this subchapter to be placed upon outside containers of hazardous materials.

"Mixture" means a material composed of more than one chemical compound or element.

"MTB" means the Materials Transportation Bureau, U.S. Department of Transportation, Washington, D.C. 20590.

"N.O.S." means Not Otherwise Specified. Other abbreviations used in this context are N.O.I. (Not Otherwise Indexed) and N.O.I.B.N. (Not Otherwise Indexed By Name).

"NRC(non-reusable container)" means a container whose reuse is restricted in accordance with the provisions of section 173.28 of the HMTR.

"Operator" means a person who controls the use of an aircraft, vessel, or vehicle.

"ORM" means Other Regulated Materials.

"Packaging" means the assembly of one or more containers and any other components necessary to assure compliance with the minimum packaging requirements of this subchapter and includes containers (other than freight containers or overpacks), portable tanks, cargo tanks, tank cars, and multi-unit tank car tanks.

"Proper shipping name" means the name of the hazardous material shown in Roman print (not italics) in section 172.101 of the HMTR.

"Shipping paper" means a shipping order, bill of lading, manifest or other shipping document serving a similar purpose and containing the information required by sections 172.202, 172.203 and 172.204 of the HMTR.

"STC(single-trip container)" means a container that may not be refilled and reshipped after having been previously emptied, except as provided in section 173.28 of the HMTR.

EPA Definitions

"Administrator" means the Administrator of the Environmental Protection Agency, or his designee.

"Constituent" or "hazardous waste constituent" means a constituent which caused the Administrator to list the hazardous waste in 40 CFR Part 261, Subpart D, or a constituent listed in Table 1 of section 261.24 of this chapter.

"Container" means any portable device in which a material is stored, transported, treated, disposed of, or otherwise handled.

"Designated facility" means a hazardous waste treatment, storage, or disposal facility which has received an EPA permit (or a facility with interim status) in accordance with the requirements of 40 CFR Parts 122 and 124, or a permit from a State authorized in accordance with Part 123 of this chapter, that has been designated on the manifest by the generator pursuant to section 262.20.

"Discharge" or "hazardous waste discharge" means the accidental or intentional spilling, leaking, pumping, pouring, emitting, emptying, or dumping of hazardous waste into or on any land or water.

"Facility" means all contiguous land, and structure, other appurtenances, and improvements on the land, used for treating, storing, or disposing of hazardous waste. A facility may consist of several treatment, storage, or disposal operational units (e.g., one or more landfills, surface impoundments, or combinations of them).

"Generator" means any person, by site, whose act or process produces hazardous waste identified or listed in 40 CFR Part 261.

"Hazardous substance", according to the Clean Water Act section 311, means elements and compounds which, when discharged in any quantity into or upon the navigable waters of the U.S. or adjoining shorelines or the waters of the contiguous zone, present an imminent and substantial danger to the public health or welfare, including, but not limited to, fish, shellfish, wildlife, shorelines, and beaches.

"Hazardous waste" means a hazardous waste as defined in 40 CFR section 261.3.

"Manifest" means the shipping document originated and signed by the generator which contains the information required by 40 CFR Part 262, Subpart B.

"Movement" means that hazardous waste transported to a facility in an individual vehicle.

"Operator" means the person responsible for the overall operation of a facility.

"Owner" means the person who owns a facility or part of a facility.

"Person" means an individual, trust, firm, joint stock company, federal agency, corporation (including a government corporation) partnership, association, state, municipality, commission, political subdivision of a state, or any interstate body.

"Solid waste" means a solid waste as defined in 40 CFR section 261.2.

"Storage" means the holding of hazardous waste for a temporary period, at the end of which the hazardous waste is treated, disposed of, or stored elsewhere.

"Transportation" means the movement of hazardous waste by air, rail, highway, or water.

"Transporter" means a person engaged in the offsite transportation of hazardous waste by air, rail, highway, or water.

"Water(bulk shipment)" means the bulk transportation of hazardous waste which is loaded or carried on board a vessel without containers or labels.

APPENDIX II

HAZARD CLASS	DEFINITIONS:
<u>CLASS A EXPLOSIVE</u> <u>CLASS B EXPLOSIVE</u> <u>CLASS C EXPLOSIVE</u> <u>BLASTING AGENT</u>	<u>An Explosive</u> - Any chemical compound, mixture, or device, the primary or common purpose of which is to function by explosion, i.e., with substantially instantaneous release of gas and heat, unless such compound, mixture, or device is otherwise specifically classified in Parts 170-189 (Sec. 173.50) Detonating or otherwise of maximum hazard. The nine (9) types of Class A explosives are defined in §173.53. Detonating or otherwise of maximum hazard. The nine types of Class A explosive are defined in §173.53. In general, function by rapid combustion rather than detonation and include some explosive devices such as special fire-works, flash powders, etc. <u>Flammable hazard</u> (§173.88) A material designed for blasting which has been tested in according with §173.114a(a))
<u>COMBUSTIBLE LIQUID</u>	Any liquid having a flash point above 100° F. and below 200° F. as determined by tests listed in §173.115(d). Exceptions to this are found in §173.114(b).
<u>CORROSIVE MATERIAL</u>	Any liquid or solid that causes visible destruction of human skin tissue or a liquid that has a severe corrosion rate on steel. (See §173.240 (a) and (b) for details)
<u>FLAMMABLE LIQUID</u>	Any liquid having a flash point below 100F. as determined by tests listed in §173.115 (d). Exceptions are listed in §173.115 (a). <u>Pyroforic Liquid</u> - Any liquid that ignites spontaneously in dry or moist air at or below 130°F. (§173.115(c)) <u>Compressed Gas</u> - Any material or mixture having in the container a pressure <u>exceeding</u> 40 psia

	at 70°F., or a pressure exceeding 104 psia at 130°F.; or any liquid flammable material having a vapor pressure exceeding 40 psia at 100°F. (§173.300(a))
FLAMMABLE GAS	Any compressed gas meeting the requirements for lower flammability limit range, flame projection, or flame propagation criteria as specified in §173.300(b).
NONFLAMMABLE GAS	Any compressed gas other than a flammable gas.
FLAMMABLE SOLID	Any solid material, other than an explosive, which is liable to cause fires through friction, retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious transportation hazard. (§173.150)
ORGANIC PEROXIDE	An organic compound containing the bivalent -O-O- structure and which may be considered a derivative of hydrogen peroxide where one or more of the hydrogen atoms have been replaced by organic radicals must be classed as an organic peroxide unless--(See §173.151(a) for details).
OXIDIZER	A substance such as chlorate, permanganate, inorganic peroxide, or a nitrate, that yields oxygen readily to stimulate the combustion of organic matter. (See §173.151)
POISON A	<u>Extremely Dangerous Poisons - Poisonous gases or liquids of such nature that a very small amount of the gas, or vapor of the liquid, mixed with air is dangerous to life</u> (§173.326)
POISON B	<u>Less Dangerous Poisons - Substances, liquids or solids (including pastes and semi-solids), other than Class A or Irritating materials, which are known to be so toxic to man as to afford a hazard to health during transportation; or which, in the absence of adequate data on human toxicity, are presumed to be toxic to man because they fall within any one of the three categories, 1) oral toxicity, 2) toxicity on inhalation, or 3) toxicity by skin absorption, described in §173.343. (See §173.343)</u>
IRRITATING MATERIAL	A liquid or solid substance which upon contact with fire or when exposed to air gives off dangerous or intensely irritating fumes, but not including any poisonous material, Class A. (§173.381)

**ETIOLOGIC
AGENT**

An "etiologic agent" means a viable micro-organism, or its toxin which causes or may cause human disease. (§173.386) (Refer to the Department of Health, Education and Welfare Regulations, Title 42, CFR, §72.25(c) for details.)

**RADIOACTIVE
MATERIAL**

Any material, or combination of materials, that spontaneously emits ionizing radiation and having a specific activity greater than 0.002 microcuries per gram. (§173.389)
NOTE: See §173.389(a) through (1) for details.

ORM-A, B or C (Other Regulated Materials)- Any material that does not meet the definition of a hazardous material, other than a combustible liquid in packing having a capacity of 110 gallons or less, and specified in §172.101 as ORM material or that possesses one or more of the characteristics described in ORM-A through E below. (See §173.500)
NOTE: An ORM with a flash point of 100°F. to 200°F., when transported with more than 110 gallons in one container shall be classed as a combustible liquid.

ORM-A

A material which has an anesthetic, irritating noxious, toxic, or other similar property and which can cause extreme annoyance or discomfort to passengers and crew in the event of leakage during transportation. (§173.500(a) (1))

ORM-B

A material (including a solid when wet with water) capable of causing significant damage to a transport vehicle or vessel from leakage during transportation. Materials meeting one or both of the following criteria are ORM-B materials: (i) A liquid substance that has a corrosion rate exceeding 0.250 inch per year (IPY) on aluminum (nonclad 7075-T6) at a test temperature of 130°F. An acceptable test is described in NACE Standard TM-01-69, and (ii) Specifically designated by name in §172.101. (§173.500 (a) (2))

ORM-C

A material which has other inherent characteristics not described as an ORM-A or ORM-B but which make it unsuitable for shipment, unless properly identified and prepared for transportation. Each ORM-C material is specifically named in §172.101. (§173.500 (a) (4)).

ORM-D

A material such as a consumer commodity which, though otherwise subject to the regulations of this subchapter, presents a limited hazard during transportation due to its form, quality and packaging. They must be materials for which exception are provided in §172.101. A shipping description applicable to each ORM-D materials is found in §172.101. (§173.500(a) (4))

ORM-E

A Material that is not included in any other hazard class, but is subject to the regulations of this subchapter, if it is a hazardous waste or a hazardous substance, as they are defined in §171.8. However, a material with a flash-point of 100°F - 200°F may not be classed as an ORM-E if it is a hazardous waste or offered in a packaging having a rated capacity of more than 110 gallons (§173.500(b) (5))

THE FOLLOWING ARE OFFERED TO EXPLAIN ADDITIONAL TERMS USED IN PREPARATION OF HAZARDOUS MATERIALS FOR SHIPMENT. (§171.8)

CONSUMER
COMMODITY
(See ORM-D)

Means a material that is packaged or distributed in a form intended and suitable for sale through retail sales agencies or instrumentalities for consumption by individuals for purpose of personal care or household use. This term also includes drugs and medicines.

FLASH POINT

Means the minimum temperature at which a substance gives off flammable vapors which in contact with spark or flame will ignite.
(§173.115 and 173.150)

FORBIDDEN

The hazardous material is one that must not be offered or accepted for transportation. §172.100 (d))

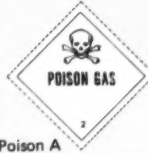
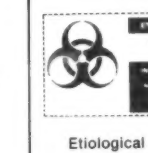
SPONTANEOUSLY
COMBUSTIBLE
MATERIAL
(SOLID)

Means a solid substance (including sludges and pastes) which may undergo spontaneous heating or self-ignition under conditions normally incident to transportation or which may upon contact with the atmosphere undergo an increase in temperature and ignite.

WATER REACTIVE
MATERIAL
(SOLID)

Means any solid substance (including sludges and pastes) which, by interaction with water, is likely to become spontaneously flammable or to give off flammable or toxic gases in dangerous quantities.

DOT Hazardous Materials Warning Labels

				 Poison A	 1	 1
 2	 2	 1		 Note: For use in addition to other required labels.	 1	 1
 8	 Poison B	 Domestic	 Export	* New Radioactive Materials Labels		
				 7	 7	 2
AIR SHIPMENTS						
	 Etiological Agents	 Magnetized Material	 Cargo Aircraft Only	Notes: 1. Symbol and inscription MUST be black or white. 2. Required as of July 1, 1983.		

General Guidelines on Use of Labels

- The Hazardous Materials Tables, Sec. 171.101 and 172.102, identify the proper label(s) for the hazardous materials listed.
- Any person who offers a hazardous material for shipment **must** label the package, if required. [Sec. 172.400(a)]
- Labels **may** be affixed to packages (even though not required by the regulations) provided **each** label represents a hazard of the material in the package. [Sec. 172.401]
- Label(s), when required, **must** be printed on or affixed to the surface of the package near the proper shipping name. [Sec. 172.406(a)]
- When two or more different labels are required, display them next to each other. [Sec. 172.406(c)]
- When two or more packages containing compatible hazardous materials are packaged within the same overpack, the outside container **must** be labeled as required for each class of material contained therein. [Sec. 172.404(b)]
- Material classed as an **Explosive A**, **Poison A**, or **Radioactive Material** also meeting the definition of another hazard class **must** be labeled for **each** class. [Sec. 172.402(a)]
- Material classed as an **Oxidizer**, **Corrosive**, **Flammable Solid**, or **Flammable Liquid** that also meets the definition of a **Poison B** **must** be labeled **POISON**, in addition to the hazard class label. [Sec. 172.402(a)(3) and (5)]
- Material classed as a **Flammable Solid** that also meets the definition of a water-reactive material **must** be labeled with **FLAMMABLE SOLID** and **DANGEROUS WHEN WET** labels. [Sec. 172.402(a)(4)]
- Material classed as a **Poison B**, **Flammable Liquid**, **Flammable Solid**, or **Oxidizer** that also meets the definition of a **Corrosive** material **must** be labeled **CORROSIVE** in addition to the class label. [Sec. 172.402(a)(6) through (9)]

This Chart does not include all of the labeling requirements. For details, refer to the Code of Federal Regulations, Title 49, Part 172, Sec. 172.400 through 172.448.



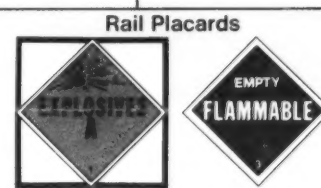
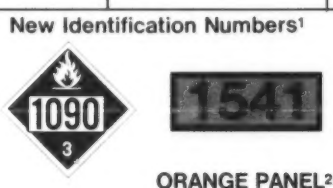
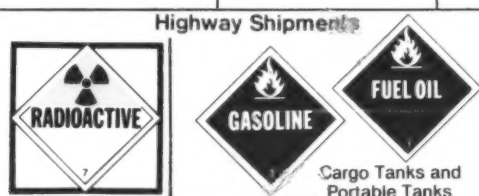
U.S. Department of Transportation
Research and Special Programs Administration

Materials Transportation Bureau
Office of Operations and Enforcement
Washington, D.C. 20590

DOT Hazardous Materials Warning Placards

*Numbers in each square (illustration numbers) refer to TABLES 1 and 2.

1 	2 	3 	4 	5 	6 
7 	8 	9 	10 	11 	12 
13 	14 	15 	16 	17 	18 



RADIOACTIVE MATERIAL PLACARD (Square Background): Use on "large quantity" shipments of radioactive materials requiring special routing. NOTE: Required for use Feb. 1, 1982.

¹**IDENTIFICATION NUMBER**—The four-digit ID number is found in the Hazardous Materials Table, Sec. 172.101, Column 3A and the Optional Hazardous Materials Table Sec. 172.102 Column 4. They are used on orange panels, certain placards and on shipping papers.

PLACARD—When ID numbers are used on placards, the ORANGE PANEL is not required.

²**ORANGE PANEL**—When ID numbers are used on ORANGE PANELS, the appropriate placard is also required.

NOTE: As of Nov. 1, 1981, ID numbers are required for use on cargo tanks, tank cars and portable tanks transporting hazardous materials. For details, see Sec. 172.332 through 172.338 and Sec. 172.519.

TABLE 1

Hazard Classes	*No.
Class A explosives	1
Class B explosives	2
Poison A	4
Flammable solid (DANGEROUS WHEN WET label only)	12
Radioactive material (YELLOW III label)	16
Radioactive material:	
Uranium hexafluoride, fissile (containing more than 0.7% U ²³⁵)	16 & 17
Uranium hexafluoride, low-specific activity (containing 0.7% or less U ²³⁵)	16 & 17

Guidelines

- Placard motor vehicles, freight containers, and rail cars containing *any quantity* of hazardous materials listed in TABLE 1.
- Placard motor vehicles and freight containers containing 1,000 pounds or more gross weight of hazardous materials classes listed in TABLE 2.
- Placard *any quantity* of hazardous materials classes listed in TABLES 1 and 2 when offered for transportation by air or water.
- Placard rail cars containing *any quantity* of hazardous materials classes listed in TABLE 2 except when less than 1,000 pounds gross weight of hazardous materials are transported in TOFC (Trailer on Flat Car) or COFC (Container on Flat Car) service.

TABLE 2

Hazard Classes	*No.
Class C explosives	18
Blasting agent	3
Nonflammable gas	6
Nonflammable gas (Chlorine)	7
Nonflammable gas (Fluorine)	15
Nonflammable gas (Oxygen, pressurized liquid)	8
Flammable gas	5
Combustible liquid	10
Flammable liquid	9
Flammable solid	11
Oxidizer	13
Organic peroxide	14
Poison B	15
Corrosive material	17
Irritating material	18

This Chart does not include all the placarding requirements. For details, refer to the Code of Federal Regulations, Title 49, Part 172, Sec. 172.500 through 172.558.



U.S. Department of Transportation
Research and Special Programs
Administration
Materials Transportation Bureau
Office of Operations and Enforcement
Washington, D.C. 20590

Chart 7 June 1981

-IV-8a

DOT Shipping Paper (Sample)

DOT Shipping Paper (Sample)

STRAIGHT BILL OF LADING

UNITED STATES DEPARTMENT OF TRANSPORTATION

Form 1 (Rev. 1-65)

To: _____

From: _____

Shipper's Name: _____

Consignee's Name: _____

Description of Goods: _____

Quantity: _____

Weight: _____

Volume: _____

Temperature: _____

Hazardous Material: _____

Special Handling: _____

Remarks: _____

Signature: _____

DOT

1000 LBS.

-Proper Shipping Name

-Total Quantity

- DOT Certification

[illegible]

- MANIFEST DOCUMENT NUMBER

Type(s) of Package(s)

- Proper Shipping Name

- Hazard Class and UN or NA identification number

Total Quantity

-EPA/ DOT CERTIFICATION

NAME, ADDRESS AND EPA
IDENTIFICATION NUMBER OF
EACH TRANSPORTER

APPENDIX V

Memorandum of Understanding between the Environmental Protection Agency and the Department of Transportation

I. PURPOSE

The purpose of this Memorandum of Understanding (MOU) is to delineate the areas of responsibility of the Department of Transportation (DOT) and the Environmental Protection Agency (EPA) for the enforcement of standards applicable to the shipment and transportation of hazardous waste. This MOU will also set forth those areas of joint responsibility and cooperation between the two Agencies.

II. STATUTORY BASIS

A. EPA and the Resource Conservation and Recovery Act of 1976

The Resource Conservation and Recovery Act of 1976 (RCRA) (42 U.S.C. 6901 et. seq.) in Section 3002 and Section 3003 requires EPA to regulate generators and transporters of hazardous wastes to protect human health and the environment. This authority covers both inter and intra-state transportation. The Act requires EPA to promulgate standards concerning recordkeeping, reporting, labeling, containers, compliance with the manifest system, and the transportation of waste only to permitted facilities.

Section 3003 also requires the Administrator of EPA to ensure that hazardous waste transportation regulations promulgated under RCRA are consistent with those promulgated by DOT under the Hazardous Materials Transportation Act (HMTA). Furthermore, it provides the Administrator the authority to make recommendations to the Secretary of Transportation respecting HMTA regulations and for addition of materials to be covered under those regulations. (40 CFR Parts 260-265.)

B. DOT and the Hazardous Materials Transportation Act

The Hazardous Materials Transportation Act (HMTA) (49 USC 1801 et. seq.) requires the Secretary of Transportation to promulgate standards for the transportation of hazardous materials in commerce to protect public health and safety or property. "In commerce" extends to all activities which affect interstate transportation. The HMTA regulations cover all modes of transportation (highway, railroad, air and water) and require, among other things, proper marking, containerization, storage, shipping papers and placarding. (49 CFR Parts 170-179.)

III. BACKGROUND

A. Regulatory Overlap

DOT and EPA are both promulgating regulations concerning hazardous waste material transportation. The DOT regulations require shippers of hazardous wastes, as defined by EPA, to comply with both HMTA and RCRA regulations. This group includes wastes which were previously designated hazardous materials. These wastes must comply with the new DOT standards for hazardous waste materials.

B. Areas of Individual Regulation

There are, however, areas over which only one or the other Agency has jurisdiction. One such area is the EPA requirement that transporters clean up any discharges of hazardous waste which they are carrying. DOT cannot incorporate such a requirement into its regulations because it is beyond DOT's authority.

DOT, on the other hand, requires that certain safety features be installed on all motor vehicles. EPA's authority does not extend to such safety requirements, and they would not be included in EPA's regulations.

IV. TERMS OF AGREEMENT

A. The Environmental-Protection Agency Will:-

1. Conduct an on-going program to monitor compliance of generators of hazardous waste and hazardous waste management facilities with the RCRA regulations.

2. Bring enforcement actions, at times, involving hazardous waste transporters where the transportation is ancillary to treatment, storage or disposal of hazardous waste or other activities normally under the primary jurisdiction of EPA as discussed in this MOU. (For example, a "midnight dumper" will be considered an illegal disposer. The fact that the "dumper" is transporting the waste is ancillary to the disposal of the waste and EPA will bring appropriate enforcement action against him.)

3. Provide to the Bureau of Motor Carrier Safety (BMCS), Federal Highway Administration's (FHWA) Washington Office, DOT on a continuing basis, a list of all hazardous waste transporters who have notified EPA pursuant to section 3010 of RCRA and their identification numbers.

4. Immediately notify the BMCS, FHWA's Washington Office, DOT of any possible violation of HMTA or regulations adopted thereunder of which it is aware and provide that office with all relevant information.

5. Investigate reports from DOT which give EPA cause to suspect that a violation of RCRA has occurred and, where warranted, initiate appropriate regulatory or enforcement action under RCRA.

6. Provide DOT with any information obtained during the course of an EPA investigation which EPA believes may involve a violation of HMTA.

7. Make available to BMCS, FHWA, DOT any reports, documents or other evidence necessary to support an enforcement action under HMTA which involves hazardous waste materials.

8. Make available to the Office of Hazardous Materials Regulation, Materials Transportation Bureau, Research and Special Programs Administration, DOT, any reports, documents or other evidence necessary to support a regulatory action under HMTA which involves hazardous waste materials.

9. Bring enforcement actions to address hazardous waste activities which may present an "imminent and substantial endangerment to health and the environment" as those words are used in the statutes administered by EPA (such as §7003 of RCRA and §504 of the Clean Water Act).

B. The Department of Transportation Will:

1. Conduct an on-going program of inspections of transporters and shippers of hazardous waste to monitor their compliance with HMTA regulations.

2. Immediately advise the appropriate EPA regional office of any possible violation of RCRA or regulations adopted thereunder of which it is aware and provide that office with all relevant information.

3. Investigate reports from EPA which give DOT cause to suspect that a violation of HMTA has occurred and, where warranted, initiate appropriate regulatory or enforcement action under HMTA.

4. Provide EPA with any information obtained during the course of a DOT investigation which DOT believes may involve a violation of RCRA.

5. Make available to EPA any reports, documents or other evidence necessary to support enforcement and regulatory actions under RCRA which involve hazardous waste.

C. Each Agency Will:

1. Presume that when information reveals a violation of both RCRA and HMTA, if DOT takes an enforcement action under HMTA, EPA will not normally take such action. Conversely, if EPA takes an enforcement action under RCRA, DOT will not normally take such action. This does not, however, preclude either Agency from initiating other legal sanctions in regard to that violation.
2. Coordinate investigations and enforcement actions involving violations of both RCRA and HMTA to avoid duplication of effort.
3. Maintain a close working relationship with the other, both in Headquarters as well as in the field, including an exchange of information relative to the Agencies' planned hazardous waste material compliance monitoring and enforcement activities.
4. Designate for the other Agency a Headquarters contact point to whom communication regarding this agreement or matters affected thereby may be referred for attention.
5. Assign regional liaisons between the Agencies, and provide a mechanism by which regional contacts will be made and maintained for the period of this agreement.
6. Issue and exchange with the other instructions and guidelines implementing this Memorandum of Understanding identifying interagency contacts and liaison representatives, and setting forth other pertinent operational procedures to be followed relative to this agreement.

V. EFFECT

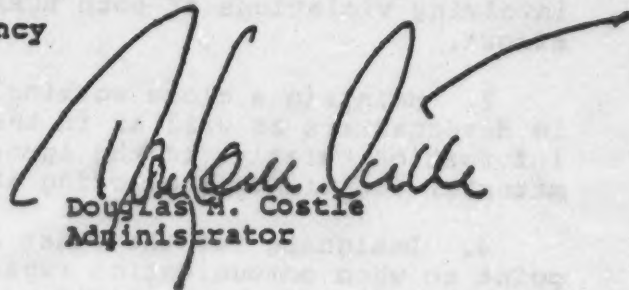
- A. This Memorandum of Understanding is not intended to limit in any way the statutory authority or jurisdiction of either Agency.
- B. Nothing in this Memorandum of Understanding modifies other existing agreements, or precludes either Agency from entering into separate agreements setting forth procedures for special programs which can be handled more efficiently and expeditiously by such special agreement.

C. This Memorandum of Understanding when accepted by both Agencies shall continue in effect unless modified by mutual written consent of both Agencies or terminated by either Agency upon a thirty day written notice.

D. Any conflict arising as a result of this Memorandum of Understanding will be resolved by EPA's Deputy Assistant Administrator for Water Enforcement and DOT's Associate Director for Operations and Enforcement, Materials Transportation Bureau, Research and Special Programs Administration.

For the Environmental Protection Agency

Approved:

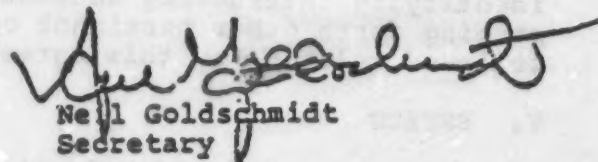


Douglas M. Costle
Administrator

Dated: May 2, 1980

For the Department of Transportation

Approved:



Neil Goldschmidt
Secretary

Dated: June 24, 1980

This Memorandum of Understanding becomes effective on the date of the final signature.

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- U.S. Department of Transportation. U.S. Code of Federal Regulations, Title 49. Washington: U.S. Government Printing Office, 1980.
- U.S. Environmental Protection Agency. Federal Register, Hazardous Waste and Consolidated Permit Regulations. Washington: U.S. Government Printing Office, 1980.